

ACT Section 2: Math.VCEplus.premium.exam.280q

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ACT

American College Testing: Math Section



Exam A

QUESTION 1

If the expression $\frac{3}{2+x} = \frac{x-5}{2x}$, then one possible value of x could be:

- A. -1
- B. -2
- C. -5
- D. 1
- E. 2

Correct Answer: A

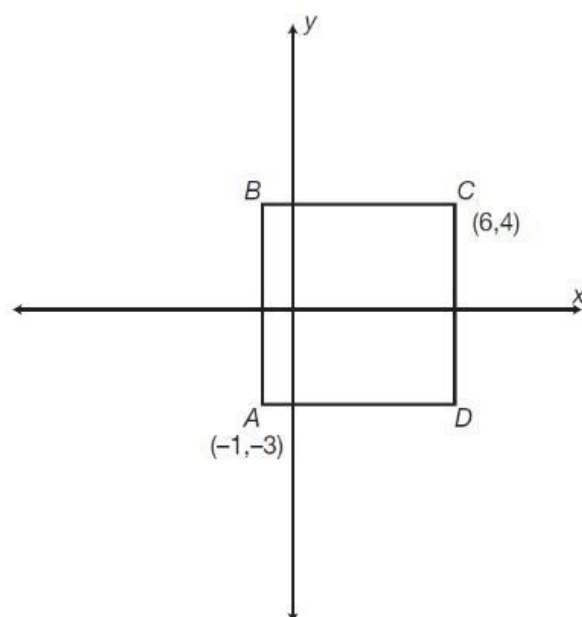
Section: (none)

Explanation

Explanation/Reference:

Explanation:
Cross multiply and solve for x :
 $3 \times 2x = (2 + x) \times (x - 5)$
 $6x = x^2 - 3x - 10$
 $x^2 - 9x - 10 = 0$
 $(x - 10)(x + 1) = 0$
 $x = 10, x = -1$

QUESTION 2



In the graph above, ABCD is a square. What are the coordinates of point B?

- A. $(-1, -4)$
- B. $(-1, 4)$
- C. $(-1, 6)$
- D. $(-3, 1)$
- E. $(-3, 4)$

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Point B is the same distance from the y -axis as point A , so the x -coordinate of point B is the same as the x -coordinate of point A (-1). Point B is the same distance from the x -axis as point C , so the y -coordinate of point B is the same as the y -coordinate of point C (4). The coordinates of point B are $(-1, 4)$.

QUESTION 3

Line $y = \frac{2}{3}x - 5$ is perpendicular to line:

- A. $y = \frac{2}{3}x + 5$
- B. $y = 5 - \frac{2}{3}x$
- C. $y = -\frac{2}{3}x - 5$
- D. $y = \frac{2}{3}x - 5$
- E. $y = -\frac{2}{3}x + 5$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:
Perpendicular lines have slopes that are negative reciprocals of each other. The slope of the line given is $\frac{2}{3}$. The negative reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$. Every line with a slope of $-\frac{3}{2}$ is perpendicular to the given line; $y = -\frac{3}{2}x + 5$ is perpendicular to $y = \frac{2}{3}x - 5$.

QUESTION 4

If 30% of r is equal to 75% of s , what is 50% of s if $r = 30$?

- A. 4.5
- B. 6
- C. 9
- D. 12
- E. 15

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:
If $r = 30$, 30% of $r = 0.30 \times 30 = 9$. 9 is equal to 75% of s . If $0.75s = 9$, then $s = 12$. 50% of $s = 0.50 \times 12 = 6$.

QUESTION 5 A dormitory now houses 30 men and allows 42 square feet of space per man. If five more men are put into this dormitory, how much less space will each man have?

- A. 5 square feet
- B. 6 square feet
- C. 7 square feet
- D. 8 square feet
- E. 9 square feet

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:
 $30 \text{ men} \times 42 \text{ square feet} = 1260 \text{ square feet of space}$; $1260 \text{ square feet} \div 35 \text{ men} = 36 \text{ square feet}$; $42 - 36 = 6$, so each man will have 6 less square feet of space.

QUESTION 6

Rob has six songs on his portable music player. How many different four-song orderings can Rob create?

- A. 30
- B. 60
- C. 120
- D. 360
- E. 720

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The order of the four songs is important. The orderings A, B, C, D and A, C, B, D contain the same four songs, but in different orders. Both orderings must be counted. The number of six-choose-four orderings is equal to $6 \times 5 \times 4 \times 3 = 360$.

QUESTION 7

The statement "Raphael runs every Sunday" is always true. Which of the following statements is also true?

- A. If Raphael does not run, then it is not Sunday.
- B. If Raphael runs, then it is Sunday.
- C. If it is not Sunday, then Raphael does not run.
- D. If it is Sunday, then Raphael does not run.
- E. If it is Sunday, it is impossible to determine if Raphael runs.

Correct Answer: A

Section: (none)

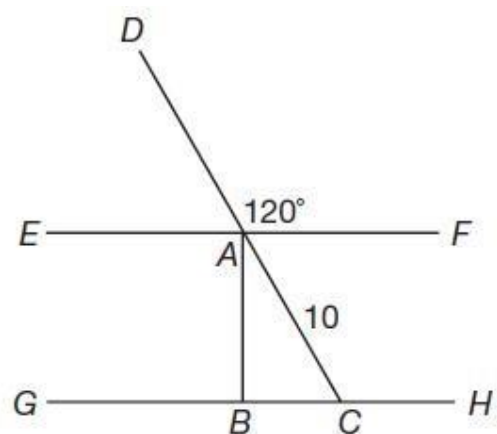
Explanation

Explanation/Reference:

Explanation:

The statement "Raphael runs every Sunday" is equivalent to "If it is Sunday, Raphael runs." The contra positive of a true statement is also true. The contra positive of "If it is Sunday, Raphael runs" is "If Raphael does not run, it is not Sunday."

QUESTION 8



In the diagram above, lines EF and GH are parallel, and line AB is perpendicular to lines EF and GH. What is the length of line AB?

- A. 5
- $5\sqrt{2}$
- $5\sqrt{3}$
- $10\sqrt{2}$
- B.

- C.
D.
E. $10\sqrt{3}$

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Line AB is perpendicular to line BC, which makes triangle ABC a right triangle. $\angle DAF$ and $\angle DHC$ are alternating angles, i.e. angles made by a pair of parallel lines cut by a transversal. $\angle DAF \cong \angle DHC$, therefore, $\angle DHC = 120^\circ$. $\angle DCH$ and $\angle ACB$ form a line. There are 180° in a line, so the measure of $\angle ACB = 180^\circ - 120^\circ = 60^\circ$. Triangle ABC is a 30-60-90 right triangle, which means that the length of the hypotenuse, AC, is equal to twice the length of the leg opposite the 30-degree angle, BC. Therefore, the length of BC is $10/2$, or 5. The length of the leg opposite the 60-degree angle, AB, is $\sqrt{3}$ times the length of the other leg, BC. Therefore, the length of AB is $5\sqrt{3}$.

QUESTION 9

The expression $\frac{(x^2+2x-15)}{(x^2+4x-21)}$ is equivalent to:

- A. $5/7$
B. $x + 5$
C. $(x + 5) / (x + 7)$
D. $-5 / (2x - 7)$
E. $(2x - 15) / (4x - 21)$

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Factor the numerator and denominator and cancel like factors: $(x^2$

$$+ 2x - 15) = (x + 5) \times (x - 3)$$

$$(x^2 + 4x - 21) = (x + 7) \times (x - 3)$$

Cancel the $(x - 3)$ term from the numerator and the denominator. The fraction reduces to $(x + 5) / (x + 7)$.

QUESTION 10 The point (2, 1) is the midpoint of a line with endpoints at (-5, 3) and:

- A. (-3, 4)
B. (-7, 2)
C. (7, 1)
D. (9, -1)
E. (-10, 3)

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:

Explanation:

The midpoint of a line is equal to the average x-coordinates and the average y-coordinates of the line's endpoints:

$$(-5 + x) / 2 = 2, -5 + x = 4, x = 9$$

$$(3 + y) / 2 = 1, 3 + y = 2, y = -1$$

The other endpoint of this line is at (9, -1).



QUESTION 11

Lindsay grows only roses and tulips in her garden. The ratio of roses to tulips in her garden is 5:6. If there are 242 total flowers in her garden, how many of them are tulips?

- A. 22
- B. 40
- C. 110D. 121
- E. 132

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The number of roses, 5x, plus the number of tulips, 6x, is equal to 242 total flowers: $5x + 6x = 242$, $11x = 242$, $x = 22$. There are $5 \times 22 = 110$ roses and $6 \times 22 = 132$ tulips in Lindsay's garden.

QUESTION 12

It takes eight people 12 hours to clean an office. How long would it take six people to clean the office?

- A. 9 hours
- B. 15 hoursC. 16 hours D. 18 hours
- E. 24 hours

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

There is an inverse relationship between the number of people and the time needed to clean the office. Multiply the number of people by the hours needed to clean the office: $8 \times 12 = 96$. Divide the total number of hours by the new number of people, 6: $96 \div 6 = 16$. It takes six people 16 hours to clean the office.

QUESTION 13 Greg has nine paintings. The Hickory Museum has enough space to display three of them. From how many different sets of three paintings does Greg have to choose?

- A. 27 B.
- 56
- C. 84
- D. 168
- E. 504

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Be careful not to count the same set of three paintings more than once – order is not important. A nine-choose-three combination is equal to $\frac{9 \times 8 \times 7}{3 \times 2 \times 1} = \frac{504}{6} = 84$.

QUESTION 14 If the surface area of a cube is 384 cm^2 , what is the volume of the cube?

- A. 64 cm^3
- B. 256 cm^3
- C. 512 cm^3
- D. 1152 cm^3 E. 4096 cm^3

Correct Answer: C

Section: (none)

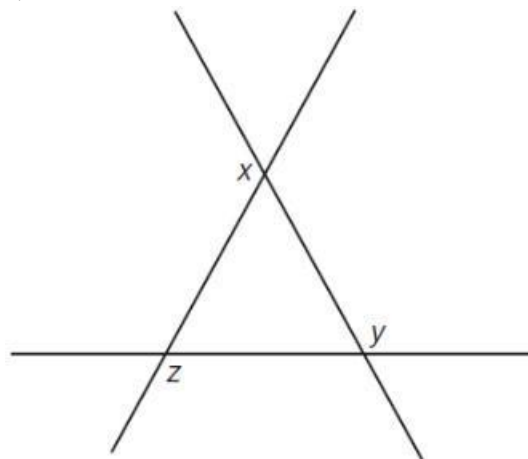
Explanation

Explanation/Reference:

Explanation:

The surface area of a cube is equal to $6 \times e^2$, where e is the length of one edge of the cube; $6 \times e^2 = 384$ cm, $e^2 = 64$, $e = 8$ cm. The volume of a cube is equal to e^3 ; $(8 \text{ cm})^3 = 512 \text{ cm}^3$.

QUESTION 15



In the diagram above, what is the sum of the measures of the $\angle x$, $\angle y$ and $\angle z$?

- A. 180°
- B. 360
- C. 540°
- D. 720°
- E. Cannot be determined.



Correct Answer: B

Section: (none)

Explanation

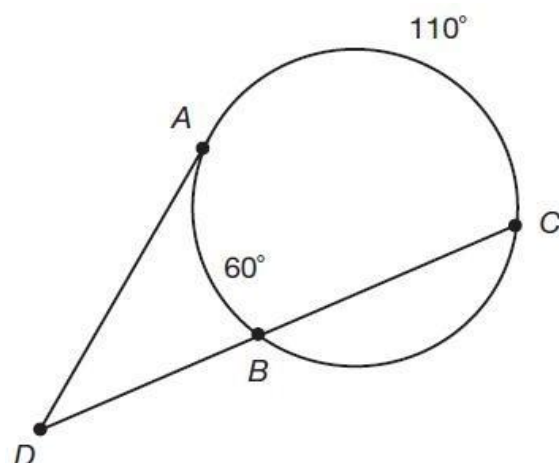
Explanation/Reference:

Explanation:

There are 180° in a line: $(x + (\text{supplement of } \angle x)) + (y + (\text{supplement of } \angle y)) + (z + (\text{supplement of } \angle z)) = 540$. The supplement of $\angle x$, the supplement of $\angle y$, and the supplement of $\angle z$ are the interior angles of a triangle. There are 180° in a triangle, so those supplements sum to 180. Therefore, $x + y + z + 180 = 540$, and $x + y + z = 360$.

QUESTION 16

Given the following figure with one tangent and one secant drawn to the circle, what is the measure of $\angle ADB$?



- A. 50 B.
85
C. 60
D. 110
E. 25

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The measure of an angle in the exterior of a circle formed by a tangent and a secant is equal to half the difference of the intercepted arcs. The two intercepted arcs are \widehat{AB} which is 60° , and \widehat{AC} which is 110° . Find half of the difference of the two arcs: $\frac{1}{2} \times (110 - 60) = \frac{1}{2} \times 50 = 25^\circ$.

QUESTION 17

COST OF BALLONS	
QUANTITY	PRICE PER BALLOON
1	\$1.00
10	\$0.90
100	\$0.75
1,000	\$0.60

Balloons are sold according to the chart above. If a customer buys one balloon at a time, the cost is \$1.00 per balloon. If a customer buys ten balloons at a time, the cost is \$0.90 per balloon. If Carlos wants to buy 2,000 balloons, how much money does he save by buying 1,000 balloons at a time rather than ten balloons at a time?

- A. \$200
B. \$300
C. \$500
D. \$600
E. \$800

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If Carlos buys ten balloons, he will pay $10 \times \$0.90 = \9 . In order to total 2,000 balloons, Carlos will have to make this purchase $2,000 \div 10 = 200$ times. It will cost him a total of $200 \times \$9 = \$1,800$. If Carlos buys 1,000 balloons, he will pay $1,000 \times \$0.60 = \600 . In order to total 2,000 balloons, Carlos will have to make this purchase $2,000 \div 1,000 = 2$ times. It will cost him a total of $2 \times \$600 = \$1,200$. It will save Carlos $\$1,800 - \$1,200 = \$600$ to buy the balloons 1,000 at a time.

QUESTION 18

If $\frac{ab}{c} = d$ and a and c are doubled, what happens to the value of d ?

- A. The value of d remains the same.
B. The value of d is doubled.
C. The value of d is four times greater.
D. The value of d is halved.
E. The value of d is four times smaller.

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

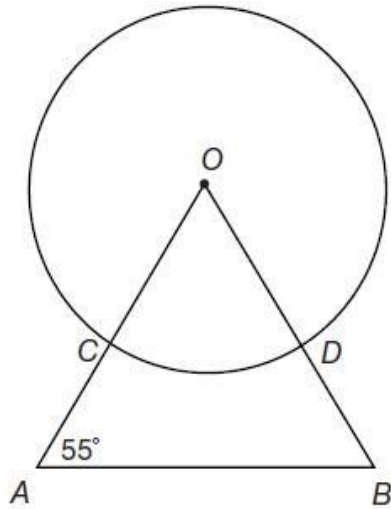
Explanation:

If a and c are doubled, the fraction on the left side of the equation becomes $\frac{2ab}{2c}$. The fraction has been multiplied by $2/2$ which is equal to 1. Multiplying a fraction by 1 does not change its value:

$$\frac{2ab}{2c} = \frac{ab}{c} = d$$

The value of d remains the same.

QUESTION 19



In the diagram above, line OA is congruent to line OB. What is the measure of arc CD?

- A. 27.5°
- B. 55°
- C. 70°
- D. 110°
- E. 125°

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Triangle AOB is isosceles because line OA is congruent to line OB. $\angle A$ and $\angle B$ are both 55° , which means that $\angle O = 180 - (55 + 55) = 70^\circ$. $\angle O$ is a central angle and arc CD is its intercepted arc. A central angle and its intercepted arc are equal in measure, so the measure of arc CD is 70° .

QUESTION 20

The expression $\frac{x\sqrt{32}}{\sqrt{4x}}$ is equivalent to:

$$2\sqrt{2}$$

$$\frac{\sqrt{2}}{2}$$

$$\frac{2\sqrt{2}}{\sqrt{x}}$$

$$\frac{x\sqrt{2}}{x}$$

$$\frac{2x\sqrt{2}}{\sqrt{x}}$$

- A.
B.
C.
D.
E.

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Simplify the numerator: $x\sqrt{32} = x\sqrt{16} \times \sqrt{2} = 4x\sqrt{2}$. Simplify the denominator: $\sqrt{4x} = \sqrt{4} \times \sqrt{x} = 2\sqrt{x}$. Divide the numerator and denominator by 2: $\frac{4x\sqrt{2}}{2\sqrt{x}} = \frac{2x\sqrt{2}}{\sqrt{x}}$.

QUESTION 21 What is the next number in the series below?

3 16 6 12 12 8

- A. 4
B. 15C. 20 D. 24
E. 32

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:

Explanation:

This series actually has two alternating sets of numbers. The first number is doubled, giving the third number. The second number has 4 subtracted from it, giving it the fourth number. Therefore, the blank space will be 12 doubled, or 24.

QUESTION 22 The volume of a glass of water placed in the sun decreases by 20%. If there are 240 ml of water in the glass now, what was the original volume of water in the glass?

- A. 192 ml
B. 260 ml
C. 288 ml
D. 300 ml E.
360 ml

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The original volume of water, x , minus 20% of x , $0.20x$, is equal to the current volume of water, 240 ml.

$$x - 0.20x = 240 \text{ ml}$$

$$0.8x = 240 \text{ ml } x =$$

$$300 \text{ ml}$$

QUESTION 23 What is the tenth term of the pattern below?

$\frac{2}{3}$, $\frac{4}{9}$, $\frac{8}{27}$, $\frac{16}{81}$...

A. $\frac{20}{30}$ B.

$2^{10/3}$

C. $\frac{2}{3}^{10}$

D. $(\frac{2}{3})^{2/3}$

E. $(\frac{2}{3})^{10}$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Each term in the pattern is equal to the fraction $\frac{2}{3}$ raised to an exponent that is equal to the position of the term in the sequence. The first term in the sequence is equal to $(\frac{2}{3})^1$, the second term is equal to $(\frac{2}{3})^2$, and so on. Therefore, the tenth term in the sequence will be equal to $(\frac{2}{3})^{10}$.

QUESTION 24

How does the area of a rectangle change if both the base and the height of the original rectangle are tripled?

A. The area is tripled.

B. The area is six times larger.

C. The area is nine times larger.

D. The area remains the same.

E. The area cannot be determined.

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Since both dimensions are tripled, there are two additional factors of 3. Therefore, the new area is $3 \times 3 = 9$ times as large as the original. For example, use a rectangle with a base of 5 and height of 6. The area is $5 \times 6 = 30$ square units. If you multiply each side length by 3, the new dimensions are 15 and 18. The new area is 15×18 , which is 270 square units. By comparing the new area with the original area, 270 square units is nine times larger than 30 square units; $30 \times 9 = 270$.

QUESTION 25

The equation $y = \frac{x+6}{x^2+7x-18}$ is undefined when $x =$:

A. -9

B. -2C. -6

D. 0

E. 9

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

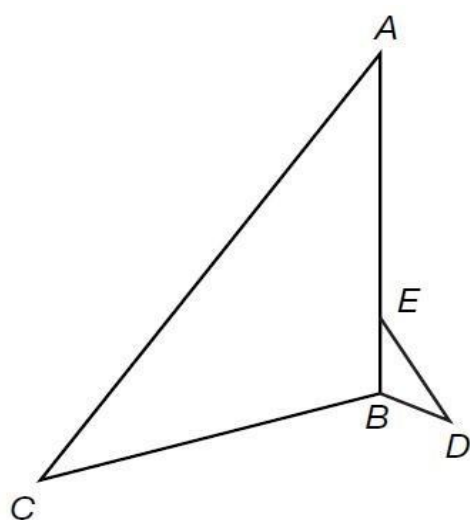
Explanation:

An equation is undefined when the value of a denominator in the equation is equal to zero. Set $x^2 + 7x - 18$ equal to zero and factor the quadratic to find its roots:

$$x^2 + 7x - 18 = (x + 9)(x - 2) = 0$$

$$x = -9, x = 2$$

QUESTION 26



In the diagram above, $\angle A$ is congruent to $\angle BED$, and $\angle C$ is congruent to $\angle D$. If the ratio of the length of AB to the length of EB is 5:1, and the area of triangle BED = $5a^2 + 10$, what is area of triangle ABC?

- A. $5a^2 + 10$
- B. $25a^2 + 50$
- C. $25a^2 + 100$
- D. $125a^2 + 250$
- E. Cannot be determined.

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Triangles ABC and BED have two pairs of congruent angles. Therefore, the third pair of angles must be congruent, which makes these triangles similar. If the area of the smaller triangle, BED, is equal to $\frac{bh}{2}$, then the area of the larger triangle, ABC, is equal to $\frac{5b \times 5h}{2}$ or $25 \times \frac{bh}{2}$. The area of triangle ABC is 25 times larger than the area of triangle BED. Multiply the area of triangle BED by 25: $25 \times (5a^2 + 10) = 125a^2 + 250$.

QUESTION 27

The number p is greater than 0, a multiple of 6, and a factor of 180. How many possibilities are there for the value of p ?

- A. 7
- B. 8
- C. 9

- D. 10
E. 11

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:

Explanation:

The positive factors of 180 (the positive numbers that divide evenly into 180) are 1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 18, 20, 30, 36, 45, 60, 90, and 180. Of these numbers, 8 (6, 12, 18, 30, 36, 60, 90, and 180) are multiples of 6.

QUESTION 28 If $g > 0$ and $h < 0$, which of the following is always positive?

- A. $g \times h$ B.
 $g + h$
C. $g - h$
D. $|h| - |g|$
E. hg

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

A positive number minus a negative number will not only always be a positive number, but will also be a positive number greater than the first operand. $g \times h$ will always be negative when one multiplicand is positive and the other is negative. $g + h$ will be positive when the absolute value of g is greater than the absolute value of h , but $g + h$ will be negative when the absolute value of g is less than the absolute value of h . $|h| - |g|$ will be positive when $|h|$ is greater than g , but $|h| - |g|$ will be negative when $|h|$ is less than g . h^g will be positive when g is an even, whole number, but negative when g is an odd, whole number.

QUESTION 29
FILL BLANK

The length of a room is three more than twice the width of the room. The perimeter of the room is 66 feet. What is the length of the room?

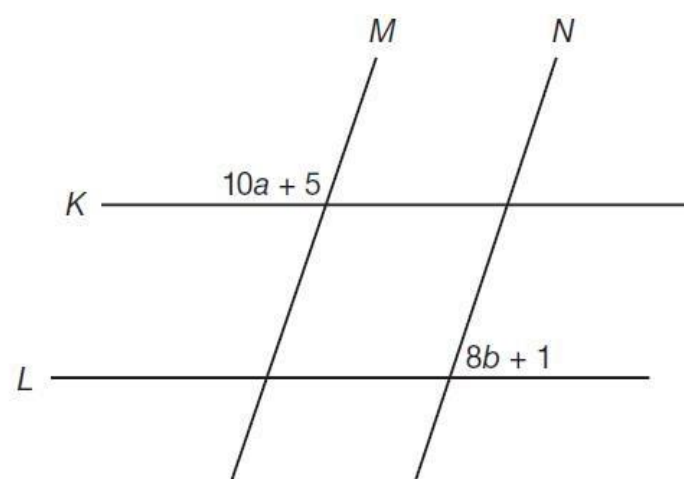
Correct Answer: 23
Section: (none)
Explanation

Explanation/Reference:

Explanation:

If x is the width of the room, then $3 + 2x$ is the length of the room. The perimeter is equal to $x + x + (3 + 2x) + (3 + 2x) = 66$; $6x + 6 = 66$; $6x = 60$; $x = 10$. The length of the room is equal to $2x + 3$, $2 \times 10 + 3 = 23$ feet.

QUESTION 30
FILL BLANK



In the diagram above, lines K and L are parallel, and lines M and N are parallel. If $b = 8$, then $a = \underline{\hspace{1cm}}$.

Correct Answer: 11

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The labeled angle formed by lines M and K and the supplement of the labeled angle formed by lines L and N are alternating angles. Therefore, they are congruent. The angle labeled $(10a + 5)$ and its supplement, which is equal to $(8b + 1)$, total 180° : $(10a + 5) + (8b + 1) = 180$. If $b = 8$, then:

$$(10a + 5) + (8 \times 8 + 1) = 180$$

$$10a + 70 = 180$$

$$10a = 110 \quad a =$$

$$11$$



QUESTION 31

FILL BLANK

If $6x + 9y - 15 = -6$, what is the value of $-2x - 3y + 5$?

Correct Answer: 2

Section: (none)

Explanation

Explanation/Reference:

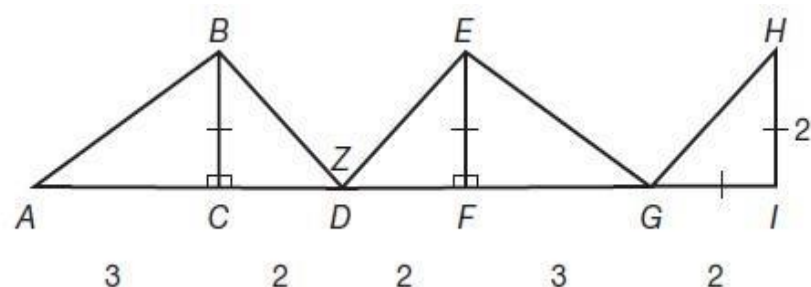
Explanation:

The first expression, $6x + 9y - 15$, is -3 times the second expression, $-2x - 3y + 5$ (multiply each term in the second expression by -3 and you'd get the first expression). Therefore, the value of the first expression, -6 , is -3 times the value of the second expression. So, you can find the value of the second expression by dividing the value of the first expression by -3 : $(-6) \div (-3) = 2$. The value of $-3x - 3y + 5 \times 2$ is just $-1/3$ times the value of $6x + 9y - 15 \times (-6)$ since $-2x - 3y + 5$ itself is $-1/3$ times $6x + 9y - 15$.

QUESTION 32

FILL BLANK

Find the measure of $\angle Z$.



Correct Answer: 90

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Triangle DBC and triangle DEF are isosceles right triangles, which means the measures of $\angle BDC$ and $\angle EDF$ both equal 45° ; $180 - (\angle BDC + \angle EDF) = \angle Z$; $180 - 90 = \angle Z$; $\angle Z = 90^\circ$.

QUESTION 33

FILL BLANK

If the distance from point $(-2, m)$ to point $(4, -1)$ is 10 units, what is the positive value of m ?

Correct Answer: 7

Section: (none)

Explanation

Explanation/Reference:

Explanation:

First, use the distance formula to form an equation that can be solved for m :

$$\text{distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$10 = \sqrt{(4 - (-2))^2 + ((-1) - m)^2}$$

$$10 = \sqrt{6^2 + (-1 - m)^2}$$

$$10 = \sqrt{36 + m^2 + 2m + 1}$$

$$10 = \sqrt{m^2 + 2m + 37}$$

$$100 = m^2 + 2m + 37$$

$$m^2 + 2m - 63 = 0$$

Now factor $m^2 + 2m - 63$:

$$(m + 9) \times (m - 7) = 0 \quad m =$$

$$7, m = -9.$$

The positive value of m is 7.

QUESTION 34

FILL BLANK

If $z^{\frac{2}{a}} = 9$, then $a = 3$ when $z =$ ____.

Correct Answer: 27

Section: (none)

Explanation

Explanation/Reference:

Explanation:



Substitute 3 for a : $z^{\frac{2}{3}} = 9$

$$z^{\frac{2 \cdot 3}{3 \cdot 2}} = 9^{\frac{3}{2}}$$

$$z = \sqrt{9^3} = 3^3 = 27$$

. To solve for z , raise both sides of the equation to the power $2/3$:

QUESTION 35

FILL BLANK

The length of a rectangular prism is four times the height of the prism and one-third the width of the prism. If the volume of the prism is 384 in^3 , what is the width of the prism?

Correct Answer: 24

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If the height of the prism is h , then the length of the prism is four times that, $4h$. The length is one-third of the width, so the width is three times the length: $12h$. The volume of the prism is equal to its length multiplied by its width multiplied by its height:

$$h \times 4h \times 12h$$

$$48h^3 = 384$$

$$h^3 = 8$$

$$h = 2$$

The height of the prism is 2 in, the length of the prism is $2 \text{ in} \times 4 = 8 \text{ in}$, and the width of the prism is $8 \text{ in} \times 3 = 24 \text{ in}$.

QUESTION 36

FILL BLANK

If $2a^2 + b = 10$ and $-(b/4 + 3a) = 11$, what is the positive value of a ?

Correct Answer: 3

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Solve $2a^2 + b = 10$ for b : $b = 10 - 2a^2$.

Substitute $(10 - 2a^2)$ for b in the second equation and solve for a :

$$-\frac{10 - 2a^2}{4} + 3a = 11$$

$$-10 + 2a^2 + 12a = 44$$

$$2a^2 + 12a - 54 = 0$$

$$2a - 6 = 0, a = 3$$

$$+ 9 = 0, a = -9$$

The positive value of a is 3.

QUESTION 37

FILL BLANK

Stephanie buys almonds at the grocery store for \$1.00 per pound. If she buys 4 pounds of almonds and pays a 5% tax on her purchase, what is Stephanie's total bill?

Correct Answer: 4.20

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If one pound of almonds costs \$1.00, then 4 pounds of almonds costs $4 \times \$1.00 = \4.00 . If Stephanie pays a 5% tax, then she pays $\$4.00 \times 0.05 = \0.20 in tax. Her total bill is $\$4.00 + \$0.20 = \$4.20$.

QUESTION 38

FILL BLANK

The ratio of the number of linear units in the circumference of a circle to the number of square units in the area of that circle is 2:5. What is the radius of the circle?

Correct Answer: 5

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The circumference of a circle $= 2\pi r$ and the area of a circle $= \pi r^2$. If the ratio of the number of linear units in the circumference to the number of square units in the area is 2:5, then five times the circumference is equal to twice the area: $5 \times$

$$2\pi r = 2(\pi r)^2$$

$$10\pi r = 2\pi r^2$$

$$10r = 2r^2$$

$$5r = r^2$$

$$= 5$$

The radius of the circle is equal to 5.

QUESTION 39

Which of the following number pairs is in the ratio 4:5?

A. $\frac{1}{4}$, $\frac{1}{5}$

B. $\frac{1}{5}$, $\frac{1}{4}$

C. $\frac{1}{5}$, $\frac{4}{5}$

D. $\frac{4}{5}$, $\frac{5}{4}$

E. 1, $\frac{4}{5}$

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Two numbers are in the ratio 4:5 if the second number is $\frac{5}{4}$ times the value of the first number; $\frac{1}{4}$ is $\frac{5}{4}$ times the value of $\frac{1}{5}$.

QUESTION 40 When $x = -3$, the expression –

$$2x^2 + 3x - 7 =$$

A. –34

B. –27

C. –16

D. –10

E. 2

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:
Substitute -3 for x :
 $-2 \times (-3)^2 + 3 \times (-3) - 7 = -2 \times 9 - 9 - 7 = -18 - 16 = -34$

QUESTION 41

What is the slope of the line $-3y = 12x - 3$?

- A. -4
- B. -3
- C. 1
- D. 4
- E. 12

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

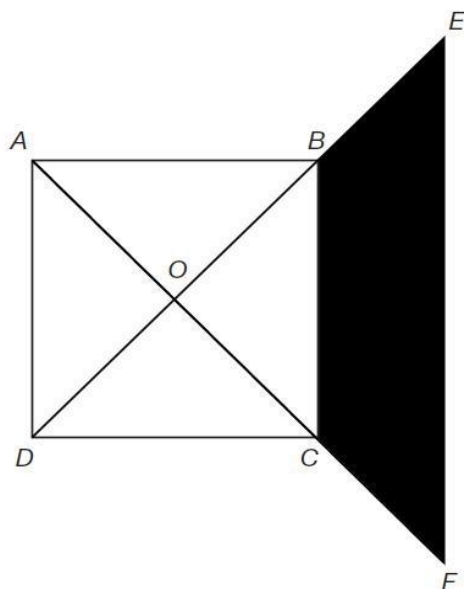
Explanation:
First, convert the equation to slope-intercept form: $y = mx + b$. Divide both sides of the equation by -3 :

$$\frac{-3y}{-3} = \frac{12x - 3}{-3}$$

$$y = -4x + 1$$

The slope of a line written in this form is equal to the coefficient of the x term. The coefficient of the x term is -4 , so the slope of the line is -4 .

QUESTION 42



In the diagram above, ABCD is a square with an area of 100 cm^2 and lines BD and AC are the diagonals of ABCD. If line EF is parallel to line BC and the length of line $CF = 3\sqrt{2} \text{ cm}$, which of the following is equal to the shaded area?

- A. 25 cm^2
- B. 39 cm^2
- C. 64 cm^2
- D. 78 cm^2
- E. 89 cm^2

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The area of a square is equal to S^2 where S is the length of one side of the square. A square with an area of 100 cm^2 has sides that are each equal to $\sqrt{100} = 10 \text{ cm}$. The diagonal of a square is equal to $\sqrt{2}$ times the length of a side of the square. Therefore, the lengths of diagonals AC and BD are $10\sqrt{2} \text{ cm}$. Diagonals of a square bisect each other at right angles, so the lengths of segments OB and OC are each $5\sqrt{2} \text{ cm}$. Since lines BC and EF are parallel and lines OC and OB are congruent, lines BE and CF are also congruent. The length of line OF is equal to the length of line OC plus the length of line CF: $5\sqrt{2} + 3\sqrt{2} = 8\sqrt{2} \text{ cm}$. In the same way, $OE = OB + BE = 5\sqrt{2} + 3\sqrt{2} = 8\sqrt{2} \text{ cm}$. The area of a triangle is equal to $\frac{1}{2}bh$, where b is the base of the triangle and h is the height of the triangle. EOF is a right triangle, and its area is equal to $\frac{1}{2} \times 8\sqrt{2} \times 2\sqrt{8} = \frac{1}{2} \times 64 \times 2 = 64 \text{ cm}^2$. The size of the shaded area is equal to the area of EOF minus one-fourth of the area of ABCD: $64 - \frac{1}{4} \times 100 = 64 - 25 = 39 \text{ cm}^2$.

QUESTION 43 If $0.34 < x < 0.40$ and $\frac{5}{16} < x < \frac{9}{20}$, which of the following could be x ?

- A. $\frac{1}{3}$
- B. $\frac{2}{5}$
- C. $\frac{3}{8}$
- D. $\frac{3}{7}$
- E. $\frac{4}{9}$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$\frac{5}{16} = 0.3125$ and $\frac{9}{20} = 0.45$; $\frac{3}{8} = 0.375$ which is between 0.34 and 0.40, and between 0.3125 and 0.45.

QUESTION 44 A store prices a coat at \$85. During a sale, the coat is sold at 20% off. After the sale, the store raises the price of the coat 10% over its sale price. What is the price of the coat now?

- A. \$18.70
- B. \$61.20
- C. \$68.00
- D. \$74.80
- E. \$93.50



Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

20% of \$85 = $0.20 \times \$85 = \17 . While on sale, the coat is sold for $\$85 - \$17 = \$68$; 10% of \$68 = $0.10 \times \$68 = \6.80 . After the sale, the coat is sold for $\$68 + \$6.80 = \$74.80$.

QUESTION 45 The expression $4x^2 - 2x + 3$ is equal to 3 when $x = 0$ and when $x =$

- A. $-\frac{1}{2}$
- B. $-\frac{1}{4}$
- C. $\frac{1}{8}$ D. $\frac{1}{4}$
- E. $\frac{1}{2}$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Set the expression $4x^2 - 2x + 3$ equal to 3 and solve for x : $4x^2 - 2x + 3 = 3$

$$4x^2 - 2x + 3 - 3 = 3 - 3$$

$$4x^2 - 2x = 0$$

$$4x \times (x - 1/2) = 0$$

$$x = 0, x = 1/2$$

QUESTION 46

A spinner is divided into eight equal regions, labeled one through eight. If Jenna spins the wheel, what is the probability that she will spin a number that is less than four and greater than two?

- A. 1/8
- B. 9/32
- C. 3/8D. 1/2
- E. 3/4

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

There are three numbers on the wheel that are less than four (1, 2, 3), but only one of those numbers (3) is greater than two. The probability of Jenna spinning a number that is both less than 4 and greater than 2 is 1/8.

QUESTION 47 The length of an edge of a cube is equal to half the height of a cylinder that has a volume of 160π cubic units. If the radius of the cylinder is 4 units, what is the surface area of the cube?

- A. 64 square units
- B. 96 square units
- C. 100 square unitsD. 125 square units
- E. 150 square units



Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The volume of a cylinder is equal to $\pi r^2 h$. The volume of the cylinder is 160π and its radius is 4. Therefore, the height of the cylinder is equal to:

$$160\pi = \pi \times 4^2 \times h$$

$$160 = 16h$$

$$h = 10$$

The length of an edge of the cube is equal to half the height of the cylinder. The edge of the cube is 5 units. The surface area of a cube is equal to $6e^2$, where e is the length of an edge of the cube. The surface area of the cube = $6 \times 5^2 = 6 \times 25 = 150$ square units.

QUESTION 48

The function $m\#n$ is equal to $m^2 - n$. Which of the following is equivalent to $m\#(n\#m)$?

- A. $-n$
- B. $n^2 - m$
- C. $m^2 + m - n^2$
- D. $(m^2 - n)^2 - n$
- E. $(n^2 - m)^2 - m$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$m\#n$ is a function definition. The problem is saying " $m\#n$ " is the same as " $m^2 - n$ ". If $m\#n$ is $n^2 - n$, then $n\#m$ is $n^2 - m$. So, to find $m\#(n\#m)$, replace $(n\#m)$ with the value of $(n\#m)$, which is $n^2 - m$: $m\#(n^2 - m)$.

Now, use the function definition again. The function definition says "take the value before the # symbol, square it, and subtract the value after the # symbol": m squared is m^2 minus the second term, $(n^2 - m)$, is equal to $m^2 - (n^2 - m) = m^2 - n^2 + m$.

QUESTION 49

Which of the following has the greatest value when $x = -1/4$?

- A. x^{-1}
- B. $-3/8x$
- C. $4x + 3$
- D. $16x$
- E. $1/81x$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$$x^{-1} = 1/x = 1 \div (-1/4) = -4; -3/8x = -$$

$$3 \div 8 \times (-1/4) = 3/2; 4x + 3 = 4 \times (-$$

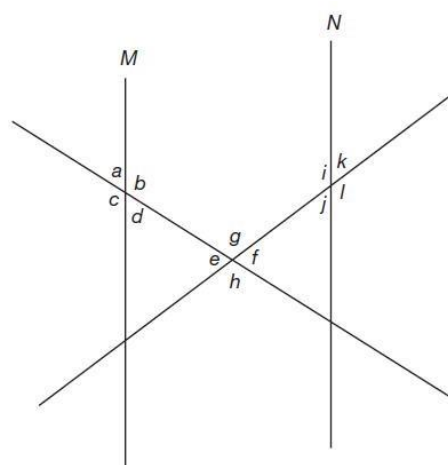
$$1/4) + 3 = -1 + 3 = 2;$$

$$16x = 16^{(-1/4)} = 1 \div 16^{1/4} = 1/2;$$

$$1/81x = 1 \div 81^{(-1/4)} = 81^{1/4} = 3.$$



QUESTION 50



In the diagram above, lines M and N are parallel. All of the following are true EXCEPT:

- A. $a + b = j + l$.
- B. $g = h$.
- C. $c + f = f + b$.
- D. $g + e + f + h = 360$.
- E. $d + e = f + j$.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference: Explanation: $\angle e$ and $\angle f$ are vertical angles, so $\angle e \cong \angle f$. However, $\angle d$ and $\angle j$ are not alternating angles. These angles are formed by different transversals. It cannot be stated that $\angle d \cong \angle j$, therefore, it cannot be stated that $d + e = f + j$.

QUESTION 51

Melissa runs the 50-yard dash five times, with times of 5.4 seconds, 5.6 seconds, 5.4 seconds, 6.3 seconds, and 5.3 seconds. If she runs a sixth dash, which of the following would change the mean and mode of her scores, but not the median?

- A. 5.3 seconds
- B. 5.4 seconds
- C. 5.5 seconds
- D. 5.6 seconds
- E. 6.3 seconds

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Melissa's mean time for the first five dashes is $\frac{5.4+5.6+6.3+5.3}{5} = \frac{28}{5} = 5.6$. Her times, in order from least to greatest, are: 5.3, 5.4, 5.4, 5.6, and 6.3. The middle score, or median, is 5.4. The number that appears most often, the mode, is 5.4. A score of 5.3 means that the mean will decrease and that the mode will no longer be 5.4 alone. The mode will now be 5.3 and 5.4. The median, however, will remain 5.4.

QUESTION 52

If $x \neq 0$ and $y \neq 0$, $\frac{\frac{\frac{xy}{y} + xy}{x}}{\frac{xy}{x}} =$ ____.

- A. $x/y + 1$.
- B. $x/y + x$.
- C. $x/y + y$.
- D. $2xy$ E. $y^2 + x$.

Correct Answer: B

Section: (none)

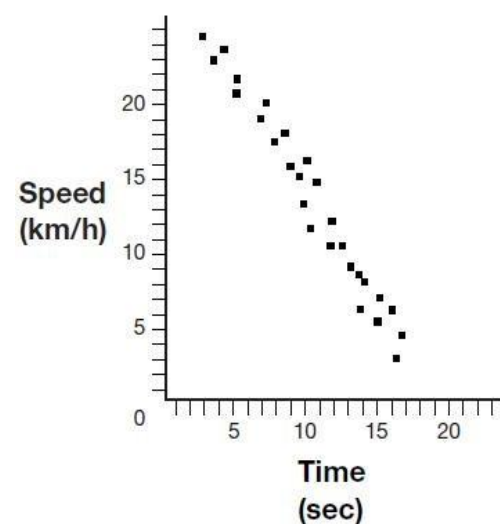
Explanation

Explanation/Reference:

Explanation:

$$\frac{\frac{\frac{xy}{y} + xy}{x}}{\frac{xy}{x}} = \left(\frac{xy}{y} + xy \right) \times \left(\frac{x}{xy} \right) = \frac{x}{y} + x$$

QUESTION 53



The scatterplot above shows the speeds of different runners over time. Which of the following could be the equation of the line of best fit?

- A. $S = -2 \times (t - 15)$
- B. $S = -t + 25$
- C. $S = -1/2 \times (t - 10)$
- D. $S = -1/2 \times (t - 20)$
- E. $S = 2 \times (t + 15)$

Correct Answer: A

Section: (none)

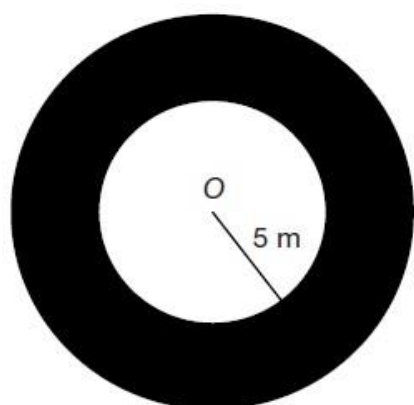
Explanation

Explanation/Reference:

Explanation:

If a straight line were drawn through as many of the plotted points as possible, it would have a negative slope. The line slopes more sharply than the line $y = -x$ (a line with a slope of -1), so the line would have a slope more negative than -1 . The line would also have a y -intercept well above the x -axis. The only equation given with a slope more negative than -1 is $S = -2 \times (t - 15)$.

QUESTION 54



The radius of the outer circle shown above is 1.2 times greater than the radius of the inner circle. What is the area of the shaded region?

- A. $6\pi \text{ m}^2$
- B. $9\pi \text{ m}^2$
- C. $25\pi \text{ m}^2$ D. $30\pi \text{ m}^2$ E. $36\pi \text{ m}^2$

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation: The area of a circle is equal to πr^2 . The radius of the inner circle is 5 m; therefore, the area of the inner circle is $25\pi \text{ m}^2$. The radius of the outer circle is $1.2 \times 5 = 6 \text{ m}$; therefore, the area of the outer circle is 36π . Subtract the area of the inner circle from the area of the outer circle: $36\pi - 25\pi = 9\pi \text{ m}^2$.

QUESTION 55

If $m = 6$, then the expression $\frac{m^2}{3} - 4m + 10$ is equal to:

- A. -12.
- B. -2.
- C. 6.
- D. 12.
- E. 22.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Substitute 6 for m :

$$\frac{6^2}{3} - 4 \times 6 + 10 = \frac{36}{3} - 24 + 10 = 12 - 14 = -2$$

QUESTION 56 Which of the following is the midpoint of a line with endpoints at $(-2, -8)$ and $(8, 0)$?

- A. $(3, 4)$
- B. $(3, -4)$ C. $(-5, 4)$ D. $(5, -4)$
- E. $(6, -8)$



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The midpoint of a line is equal to the average of the x - and y -coordinates of its endpoints. The average of the x -coordinates $= \frac{-2+8}{2} = \frac{6}{2} = 3$. The average of the y -coordinates $= \frac{-8+0}{2} = -\frac{8}{2} = -4$. The midpoint of this line is at $(3, -4)$.

QUESTION 57 If $4x + 5 = 15$, then $10x + 5 =$:

- A. 2.5.
- B. 15.
- C. 22.5.
- D. 25.
- E. 30.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If $4x + 5 = 15$, then $4x = 10$ and $x = 2.5$. Substitute 2.5 for x in the second equation: $10 \times 2.5 + 5 = 25 + 5 = 30$.

QUESTION 58 A music store offers customized guitars. A buyer has four choices for the neck of the guitar, two choices for the body of the guitar, and six choices for the color of the guitar. The music store offers:

- A. 12 different guitars.
- B. 16 different guitars.
- C. 24 different guitars.
- D. 36 different guitars.
- E. 48 different guitars.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

To find the total number of different guitars that are offered, multiply the number of neck choices by the number of body choices by the number of color choices: $4 \times 2 \times 6 = 48$ different guitars.

QUESTION 59 Which of the following is the set of positive factors of 12 that are NOT multiples of 2?

- A. $\{ \}$
- B. $\{1\}$
- C. $\{1, 3\}$
- D. $\{1, 2, 3\}$
- E. $\{2, 4, 6, 12\}$

Correct Answer: C

Section: (none)

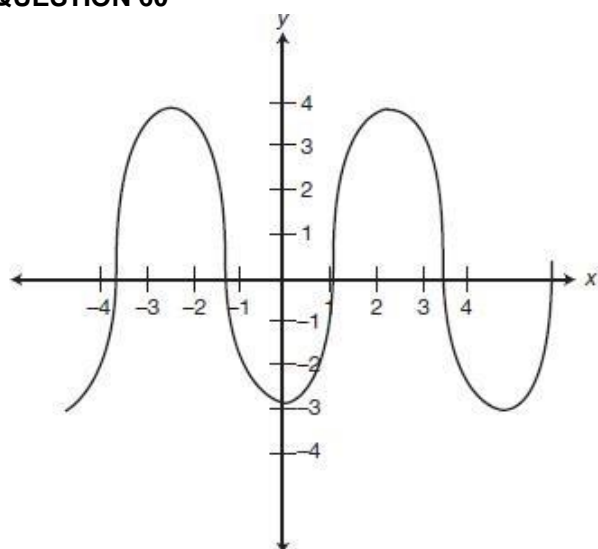
Explanation

Explanation/Reference:

Explanation:

The set of positive factors of 12 is $\{1, 2, 3, 4, 6, 12\}$. All of the even numbers (2, 4, 6, and 12) are multiples of 2. The only positive factors of 12 that are not multiples of 2 are 1 and 3.

QUESTION 60



The graph of $f(x)$ is shown above. How many values can be found for $f(3)$?

- A. 0
- B. 1
- C. 2
- D. 4

E. Cannot be determined.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Be careful – the question asks you for the number of values of $f(3)$ not $f(x) = 3$. In other words, how many y values can be generated when $x = 3$? If the line $x = 3$ is drawn on the graph, it passes through only one point. There is only one value for $f(3)$.

QUESTION 61

The expression $\frac{x^2 + 5x}{x^3 - 25x}$ can be reduced to:

A. 1.

B. $\frac{5}{x^2 - 25}$

C. $x + 5$.

D. $\frac{1}{x - 5}$.

E. $\frac{1}{x + 5}$.

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Factor the numerator and denominator of the fraction: $(x^2$

$+ 5x) = x \times (x + 5)$

$(x^3 - 25x) = x \times (x + 5) \times (x - 5)$

There is an x term and an $(x + 5)$ term in both the numerator and denominator. Cancel those terms, leaving the fraction $\frac{1}{x - 5}$.

QUESTION 62

Which of the following is the vertex of the parabola which is the graph of the equation $y = (x + 1)^2 + 2$?

A. $(-1, -2)$

B. $(1, -2)$

C. $(-1, 2)$

D. $(1, 2)$

E. $(2, -1)$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The equation of a parabola with its turning point c units to the left of the y -axis is written as $y = (x + c)^2$. The equation of a parabola with its turning point d units above the x -axis is written as $y = x^2 + d$. The vertex of the parabola formed by the equation $y = (x + 1)^2 + 2$ is found one unit to the left of the y -axis and two units above the x -axis, at the point $(-1, 2)$. Alternatively, test each answer choice by plugging the x value of the choice into the equation and solving for y . Only the coordinates in choice C, $(-1, 2)$, represent a point on the parabola: $(y = (-1 + 1)^2 + 2$

$2 = (-1 + 1)^2 + 2,$

$2 = (0)2 + 2$, $2 = 2$ so it is the only point of the choices given that could be the vertex of the parabola.

QUESTION 63

$a^{\frac{b}{c}}$ is equivalent to:

A. $\sqrt[c]{a^b}$

B. $\sqrt[b]{a^c}$

C. $\frac{1}{a^{\frac{c}{b}}}$

D. $\frac{\sqrt{a^b}}{c}$

E. $\frac{a^b}{c}$

A.

B.

C.

D.

E.

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

When a base is raised to a fractional exponent, raise the base to the power given by the numerator and take the root given by the denominator. Raise the base, a , to the b th power, since b is the numerator of the exponent. Then, take the c th root of that: $\sqrt[c]{a^b}$.

QUESTION 64

If the statement “No penguins live at the North Pole” is true, which of the following statements must also be true?

A. All penguins live at the South Pole.

B. If Flipper is not a penguin, then he lives at the North Pole.

C. If Flipper is not a penguin, then he does not live at the North Pole.

D. If Flipper does not live at the North Pole, then he is a penguin.

E. If Flipper lives at the North Pole, then he is not a penguin.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

No penguins live at the North Pole, so anything that lives at the North Pole must not be a penguin. If Flipper lives at the North Pole, then he, like all things at the North Pole, is not a penguin.

QUESTION 65 If $p < 0$, $q > 0$, and $r > p$, then which of the following must be true?

A. $p + r > 0$

- B. $rp < rq$
- C. $pr < rq$
- D. $r + q > q$
- E. $p + r < r + q$

Correct Answer: E

Section: (none)

Explanation

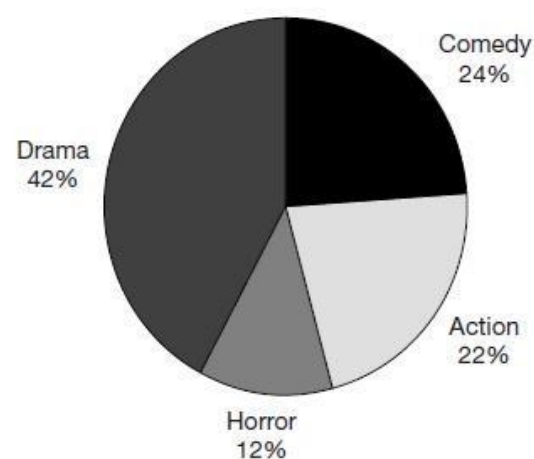
Explanation/Reference:

Explanation:

If $p < 0$, $q > 0$, then $p < q$. Since $p < q$, p plus any value will be less than q plus that same value (whether positive or negative). Therefore, $p + r < r + q$.

QUESTION 66

Al's Video Vault Rentals



The pie chart above shows the distribution of video rentals from Al's Video Vault for a single night. If 250 videos were rented that night, how many more action movies were rented than horror movies?

- A. 10
- B. 20
- C. 22
- D. 25
- E. 30

Correct Answer: D

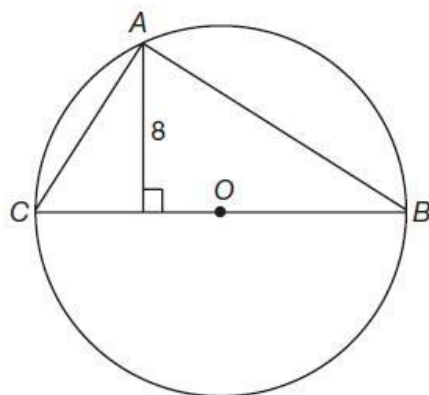
Section: (none)

Explanation

Explanation/Reference:

Explanation:

22% of the movies rented were action movies; $250 \times 0.22 = 55$ movies; 12% of the movies rented were horror movies; $250 \times 0.12 = 30$ movies. There were $55 - 30 = 25$ more action movies rented than horror movies. **QUESTION**



If the circumference of the circle in the diagram above is 20π units, what is the area of triangle ABC?

- A. 40 square units
- B. 80 square units
- C. 80π square units
- D. 160 square units
- E. 160π square units

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The circumference of a circle is equal to $2\pi r$, where r is the radius of the circle. If the circumference of the circle = 20π units, then the radius of the circle is equal to ten units. The base of triangle ABC is the diameter of the circle, which is twice the radius. The base of the triangle is 20 units and the height of the triangle is eight units. The area of a triangle is equal to $\frac{1}{2}bh$ where b is the base of the triangle and h is the height of the triangle. The area of triangle ABC = $\frac{1}{2} \times 80 \times 20 = \frac{1}{2} \times 160 = 80$ square units.

QUESTION 68

The area of an isosceles right triangle is 18 cm^2 . What is the length of the hypotenuse of the triangle?

- A. 6 cm
- $6\sqrt{2}$ B. cm C. cm D. cm
- $18\sqrt{2}$ $36\sqrt{2}$
- $18\sqrt{3}$
- E. cm

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

The area of a triangle is equal to $\frac{1}{2}bh$ where b is the base of the triangle and h is the height of the triangle. The base and height of an isosceles right triangle are equal in length. Therefore, $\frac{1}{2}b^2 = 18$, $b^2 = 36$. $B=6$. The legs of the triangle are 6 cm. The hypotenuse of an isosceles right triangle is equal to the length of one leg multiplied by $\sqrt{2}$. The hypotenuse of this triangle is equal to $6\sqrt{2}$ cm

QUESTION 69

If $a < \frac{43}{3x} < b$ and $a = 4$ and $b = 8$, which of the following could be true?

- A. $x < a$
- B. $x > b$
- C. $a < x < b$ D. $4 < x < 8$
- E. None of the above

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If $a = 4$, x could be less than a . For example, x could be 3: $4 < \frac{43}{3 \times 3} < 8$, $4 < \frac{43}{9} < 8$, $4 < 4\frac{7}{9} < 8$. Although $x < a$ is not true for all values of x , it is true for some values of x .

QUESTION 70

The length of a rectangle is one greater than three times its width. If the perimeter of the rectangle is 26 feet, what is the area of the rectangle?

- A. 13 ft²
- B. 24 ft²
- C. 30 ft²
- D. 78 ft²
- E. 100 ft²

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The perimeter of a rectangle is equal to $2l + 2w$, where l is the length of the rectangle and w is the width of the rectangle. If the length is one greater than three times the width, then set the width equal to x and set the length equal to $3x + 1$: $2 \times$

$$(3x + 1) + 2x = 26$$

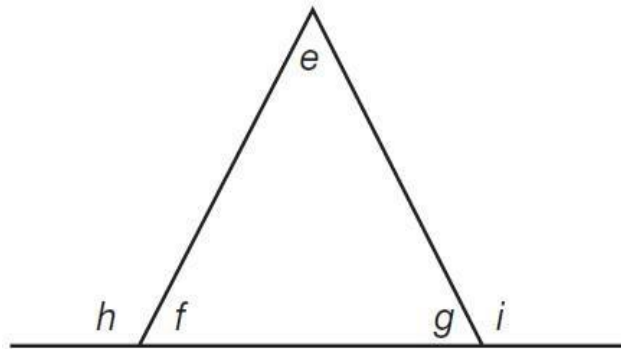
$$6x + 2 + 2x = 26$$

$$8x = 24$$

$$x = 3$$

The width of the rectangle is 3 ft and the length of the rectangle is 10 ft. The area of a rectangle is equal to lw ; $10 \text{ ft} \times 3 \text{ ft} = 30 \text{ ft}^2$.

QUESTION 71



Based on the diagram above, which of the following is true?

- A. $i = e + f$
- B. $g + i = h + e$
- C. $e + i = e + h$
- D. $e + g + i = 180$
- E. $e + f + g + h + i = 360$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The measure of an exterior angle of a triangle is equal to the sum of the two interior angles of the triangle to which the exterior angle is NOT supplementary. $\angle i$ is supplementary to $\angle g$, so the sum of the interior $\angle e$ and $\angle f$ is equal to the measure of $\angle i$: $i = e + f$.

QUESTION 72 Which of the following is an

irrational number? A. $\sqrt{\frac{4}{9}}$

B. 4^{-3}

$$-(\sqrt{3}\sqrt{3})$$

$$\frac{\sqrt{72}}{\sqrt{200}}$$

$$(\sqrt{32})^3$$

C.

D.

E.

Correct Answer: E

Section: (none)

Explanation

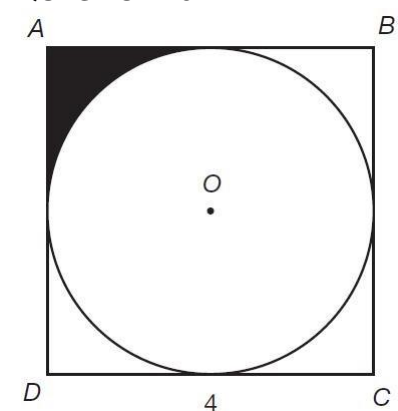
Explanation/Reference:

Explanation:

An irrational number is a number that cannot be expressed as a repeating or terminating decimal.

$(\sqrt{32})^3 = \sqrt{32} \times \sqrt{32} \times \sqrt{32} = 32\sqrt{32} = 32\sqrt{16\sqrt{2}} = 32 \times 4\sqrt{2} = 128\sqrt{2}$. $\sqrt{2}$ cannot be expressed as a repeating or terminating decimal, therefore, $128\sqrt{2}$ is an irrational number.

QUESTION 73



In the diagram above, the length of a side of square ABCD is four units. What is the area of the shaded region?

A. 4

B. $4 - \pi$

C. $4 - 4\pi$

D. 16π

E. $16 - 4\pi$

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The area of a square is equal to S^2 , where S is the length of a side of the square. The area of ABCD is $4^2 = 16$ square units. The area of a circle is equal to πr^2 , where r is the radius of the circle.

The diameter of the circle is four units. The radius of the circle is $4/2 = 2$ square units. The area of the circle is equal to $\pi \times 2^2 = 4\pi$. The shaded area is equal to one-fourth of the difference between the area of the square and the area of the circle: $1/4 \times (16 - 4\pi) = 4 - \pi$.

QUESTION 74

The value of d is increased 50%, then decreased 50%. Compared to its original value, the value of d is now:

- A. 25% smaller.
- B. 25% larger.
- C. 50% smaller.
- D. 50% larger.
- E. the same.

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

To increase d by 50%, multiply d by 1.5: $d = 1.5d$. To find 50% of $1.5d$, multiply $1.5d$ by 0.5: $1.5d \times 0.5 = 0.75d$. Compared to its original value, d is now 75% of what it was. The value of d is now 25% smaller.

QUESTION 75 Which of the following expressions is

undefined when $x = -2$? A.

$$y = \frac{x+2}{x-2}$$

$$y = \frac{x^2+4x+4}{x-2}$$

$$y = \frac{2x+4}{x^2-4x+4}$$

$$y = \frac{x^2+3x+2}{-x^2+2}$$

$$y = \frac{x^2+2x+2}{x^2+6x+8}$$

- B.
- C.
- D.
- E.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

An expression is undefined when a denominator of the expression is equal to zero. When $x = -2$, $x^2 + 6x + 8 = (-2)^2 + 6 \times (-2) + 8 = 4 - 12 + 8 = 0$.

QUESTION 76 If graphed, which of the following pairs of equations would be parallel to each other?

- A. $y = 2x + 4$, $y = x + 4$
- B. $y = 3x + 3$, $y = -1/3x - 3$

- C. $y = 4x + 1$, $y = 1/5x + 5$
 D. $y = 5x + 5$, $y = 1/5x + 5$
 E. $y = 6x + 6$, $y = 6x - 4$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Parallel lines have the same slope. The lines $y = 6x + 6$ and $y = 6x - 6$ both have a slope of 6, so they are parallel to each other.

QUESTION 77

$$\frac{a}{b-4} = \frac{4b}{a} + 1$$

If $\frac{a}{b-4} = \frac{4b}{a} + 1$, then when $a = 8$, b could be equal to:

- A. -2
 B. 4C. 6 D. 7 E. 8

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$$\text{Substitute 8 for } a: \frac{8}{b-4} = \frac{4b}{8} + 1$$

$$\frac{8}{b-4} = \frac{4b+8}{8}$$

. Rewrite 1 as $8/8$ and add it to $4b/8$, then cross multiply:

$$4b^2 - 8b - 32 = 64$$

$$b^2 - 2b - 8 = 16 \quad b^2$$

$$-2b - 24 = 0 \quad (b -$$

$$6) \times (b + 4) = 0 \quad b -$$

$$6 = 0, \quad b = 6 \quad b + 4 =$$

$$0, \quad b + -4$$



QUESTION 78

The average of five consecutive odd integers is -21 . What is the least of these integers?

- A. -17
 B. -19
 C. -21
 D. -23
 E. -25

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If the average of five consecutive odd integers is -21 , then the third integer must be -21 . The two larger integers are -19 and -17 and the two lesser integers are -23 and -25 . -25 is the least of the five integers. Remember, the more a number is negative, the less is its value.

QUESTION 79

Line AC is a diagonal of square ABCD. What is the sine of $\angle ACB$?

A. $\frac{1}{2}$

$$\sqrt{2}$$

$$\frac{\sqrt{2}}{2}$$

$$\frac{\sqrt{3}}{2}$$

B.

C.

D.

E. Cannot be determined

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

A square has four right (90-degree) angles. The diagonals of a square bisect its angles. Diagonal AC bisects C, forming two 45-degree angles, $\angle ACB$ and $\angle ACD$. The sine of 45° is equal to $\frac{\sqrt{2}}{2}$.

QUESTION 80

If the height of a cylinder is doubled and the radius of the cylinder is halved, the volume of the cylinder:

A. remains the same.

B. becomes twice as large.

C. becomes half as large.

D. becomes four times larger.

E. becomes four times smaller.



Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The volume of a cylinder is equal to $\pi r^2 h$, where r is the radius of the cylinder and h is the height. The volume of a cylinder with a radius of 1 and a height of 1 is π . If the height is doubled and the radius is halved, then the volume becomes $\pi \times (1/2)^2 \times 2 \times 1 = \pi \times 1/4 \times 2 = 1/2\pi$. The volume of the cylinder has become half as large.

QUESTION 81

$$\frac{\frac{b}{a} - a}{\frac{1}{a^{-1}}}$$

A. b

B. $b - a^2$

C. $b/a - 1$

D. $b/a^2 - 1$ E. $b/a^2 - a$

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$$\frac{1}{a^{-1}} = \frac{1}{\frac{1}{a}} = a$$

$$\frac{\frac{b}{a} - a}{a} = \left(\frac{b}{a} - a \right) \times \frac{1}{a} = \frac{b}{a^2 - 1}$$

QUESTION 82 The ratio of the number of cubic units in the volume of a cube to the number of square units in the surface area of the cube is 2:3. What is the surface area of the cube?

- A. 16 square units
- B. 24 square units
- C. 64 square units
- D. 96 square units
- E. 144 square units

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The volume of a cube is equal to e^3 , where e is the length of an edge of the cube. The surface area of a cube is equal to $6e^2$. If the ratio of the number of cubic units in the volume to the number of square units in the surface area is 2:3, then three times the volume is equal to two times the surface area: $3e^3 = 2 \times 6e^2$

$$3e^3 = 12e^2$$

$$3e = 12$$

$$e = 4$$

The edge of the cube is four units and the surface area of the cube is $6 \times 4^2 = 96$ square units.



QUESTION 83

FILL BLANK

If a number is chosen at random from a set that contains only the whole number factors of 24, what is the probability that the number is either a multiple of four or a multiple of six?

Correct Answer: 5/8

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The set of whole number factors of 24 is {1, 2, 3, 4, 6, 8, 12, 24}. Of these numbers, four (4, 8, 12, 24) are multiples of four and three (6, 12, 24) are multiples of six. Be sure not to count 12 and 24 twice – there are five numbers out of the eight factors of 24 that are a multiple of either four or six. Therefore, the probability of selecting one of these numbers is 5/8.

QUESTION 84

FILL BLANK

There are 750 students in the auditorium for an assembly. When the assembly ends, the students begin to leave. If 32% of the students have left so far, how many students are still in the auditorium?

Correct Answer: 510

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If 32% of the students have left the auditorium, then $100 - 32 = 68\%$ of the students are still in the auditorium; 68% of 750 = $0.68 \times 750 = 510$ students.

QUESTION 85

FILL BLANK

If point A is at $(-1, 2)$ and point B is at $(11, -7)$, what is length of line AB ?

Correct Answer: 15

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Use the distance formula to find the distance from $(-1, 2)$ to $(11, -7)$:

$$distance = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$distance = \sqrt{(11 - (-1))^2 + ((-7) - 2)^2}$$

$$distance = \sqrt{12^2 + (-9)^2}$$

$$distance = \sqrt{144 + 81}$$

$$distance = \sqrt{255}$$

Distance is 15 units.

QUESTION 86

FILL BLANK

Robert is practicing for the long jump competition. His first four jumps measure 12.4 ft, 18.9 ft, 17.3 ft, and 15.3 ft, respectively. If he averages 16.3 feet for his first five jumps, what is the length in feet of his fifth jump?

Correct Answer: 17.6

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If Robert averages 16.3 feet for five jumps, then he jumps a total of $16.3 \times 5 = 81.5$ feet. The sum of Robert's first four jumps is $12.4 \text{ ft} + 18.9 \text{ ft} + 17.3 \text{ ft} + 15.3 \text{ ft} = 63.9 \text{ ft}$. Therefore, the measure of his fifth jump is equal to $81.5 \text{ ft} - 63.9 \text{ ft} = 17.6 \text{ ft}$.

QUESTION 87

FILL BLANK

There are seven students on the trivia team. Mr. Randall must choose four students to participate in the trivia challenge. How many different groups of four students can Mr. Randall form?

Correct Answer: 35

Section: (none)

Explanation

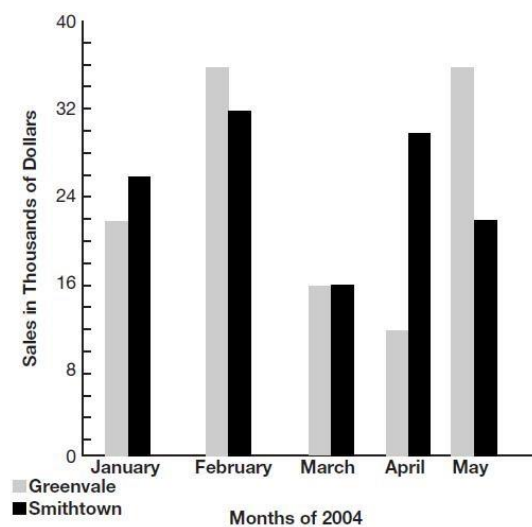
Explanation/Reference:

Explanation:

The order of the four students chosen does not matter. This is a "seven-choose-four" combination problem – be sure to divide to avoid counting duplicates: $\frac{7 \times 6 \times 5 \times 4}{4 \times 3 \times 2 \times 1} = \frac{840}{24} = 35$. There are 35 different groups of four students that Mr. Randall could form.

QUESTION 88

FILL BLANK



The graph above shows the sales by month for the Greenvale and Smithtown branches of SuperBooks. From January through May, how much more money did the Smithtown branch gross in sales than the Greenvale branch?

Correct Answer: 4000

Section: (none)

Explanation

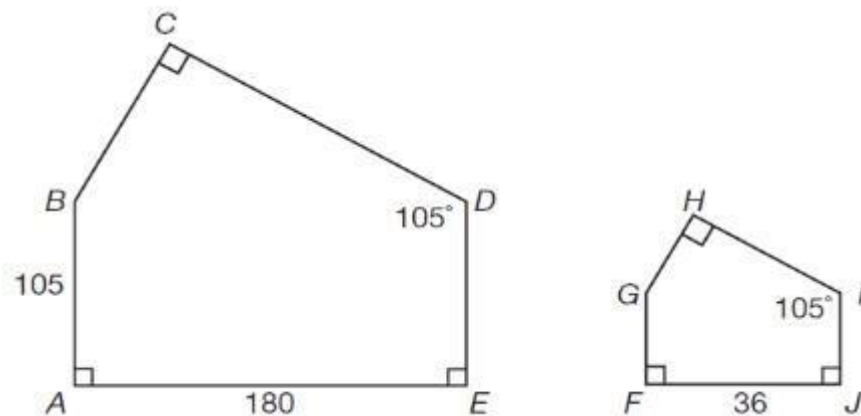
Explanation/Reference:

Explanation:

The Greenvale sales, represented by the light bars, for the months of January through May respectively were \$22,000, \$36,000, \$16,000, \$12,000, and \$36,000, for a total of \$122,000. The Smithtown sales, represented by the dark bars, for the months of January through May respectively were \$26,000, \$32,000, \$16,000, \$30,000, and \$22,000, for a total of \$126,000. The Smithtown branch grossed $\$126,000 - \$122,000 = \$4,000$ more than the Greenvale branch.

QUESTION 89

FILL BLANK



In the diagram above, what is the length of side FG?

Correct Answer: 21

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Both figures contain five angles. Each figure contains three right angles and an angle labeled 105° . Therefore, the corresponding angles in each figure whose measures are not given ($\angle B$ and $\angle G$, respectively) must also be equal, which makes the two figures similar. The lengths of the sides of similar figures are in the same ratio. The length of side FJ is 36 units and the length of its corresponding side, AE, in figure ABCDE is 180 units. Therefore, the ratio of side FJ to side AE is $36:180$ or $1:5$. The lengths of sides FG and AB are in the same ratio. If the length of side FG is x , then: $\frac{x}{105} = \frac{1}{5}$, $5x = 105$, $x = 21$. The length of side FG is 21 units.

QUESTION 90

FILL BLANK

DeDe and Mike both run the length of a two-mile field. If DeDe runs 5 mph and Mike runs 6 mph, how many more minutes does it take DeDe to run the field?

Correct Answer: 4

Section: (none)

Explanation

Explanation/Reference:

Explanation:

DeDe runs 5 mph, or 5 miles in 60 minutes. Use a proportion to find how long it would take for DeDe to run 2 miles: $\frac{5}{60} = \frac{2}{x}$, $5x = 120$, $x = 24$ minutes.

Greg runs 6 mph, or 6 miles in 60 minutes. Therefore, he runs 2 miles in $\frac{6}{60} = \frac{2}{x}$, $6x = 120$, $x = 20$ minutes.

It takes DeDe $24 - 20 = 4$ minutes longer to run the field.

QUESTION 91

FILL BLANK

Point A of rectangle ABCD is located at $(-3, 12)$ and point C is located at $(9, 5)$. What is the area of rectangle ABCD?

Correct Answer: 84

Section: (none)

Explanation

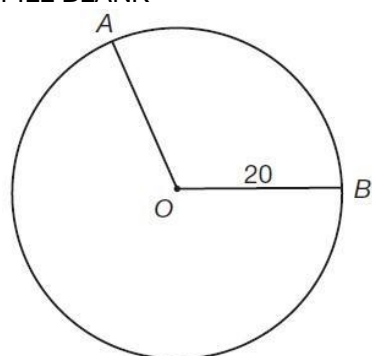
Explanation/Reference:

Explanation:

If point A is located at $(-3, 12)$ and point C is located at $(9, 5)$, that means that either point B or point D has the coordinates $(-3, 5)$ and the other has the coordinates $(9, 12)$. The difference between the different x values is $9 - (-3) = 12$ and the difference between the different y values is $12 - 5 = 7$. The length of the rectangle is 12 units and the width of the rectangle is 7 units. The area of a rectangle is equal to its length multiplied by its width, so the area of ABCD = $12 \times 7 = 84$ square units.

QUESTION 92

FILL BLANK



In the diagram above, the radius of the circle is 20 units and the length of arc AB is 15π units. What is the measure in degrees of $\angle AOB$?

Correct Answer: 135

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The length of an arc is equal to the circumference of the circle multiplied by the measure of the angle that intercepts the arc divided by 360. The arc measures 15π units, the circumference of a circle is 2π multiplied by the radius, and the radius of the circle is 20 units. If x represents the measure of $\angle AOB$, then:

$$15\pi = \frac{x}{360} \times 2\pi \times 20$$

$$15 = \frac{x}{360} \times 40$$

$$15 = \frac{x}{9}$$

$$x = 135$$

The measure of $\angle AOB$ is 135° .

QUESTION 93

All of the following are less than $\frac{2}{5}$ EXCEPT:

- A. $\frac{1}{3}$
- B. 0.04
- C. $\frac{3}{8}$
- D. $\frac{3}{7}$
- E. 0.0404

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$$\frac{2}{5} = 0.040$$

$$\frac{3}{7} \approx 0.043$$

...

Comparing the hundredths digits, $3 > 0$, therefore, $0.43 > 0.40$ and $\frac{3}{7} > \frac{2}{5}$.

QUESTION 94 If $3x - y = 2$ and $2y - 3x = 8$, which of the following is equal to x/y ?

- A. $\frac{2}{3}$
- B. $\frac{2}{5}$
- C. $2\frac{1}{2}$
- D. 4
- E. $\frac{6}{5}$

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Solve $3x - y$ for y : $-y = -3x + 2$, $y = 3x - 2$.

Substitute $3x - 2$ for y in the second equation and solve for x :

$$2 \times (3x - 2) - 3x = 8$$

$$6x - 4 - 3x = 8$$

$$3x - 4 = 8$$

$$3x = 12$$

$$x = 4$$

Substitute the value of x into the first equation to find the value of y :

$$3 \times 4 - y = 2 \quad 12 - y = 2 \quad y = 10$$

$$x/y = 4/10 = 2/5$$

QUESTION 95

Which of the following sets of numbers contains all and only the roots of the equation $f(x) = x^3 + 7x^2 - 8x$?

- A. $\{-8, 1\}$
- B. $\{8, -1\}$
- C. $\{0, -8, 1\}$
- D. $\{0, 8, -1\}$
- E. $\{0, -1, -8, 1, 8\}$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The roots of an equation are the values for which the equation evaluates to zero. Factor $x^3 + 7x^2 - 8x$: $x^3 + 7x^2 - 8x = x \times (x^2 + 7x - 8) = x \times (x + 8) \times (x - 1)$. When $x = 0, -8$, or 1 , the equation $f(x) = x^3 + 7x^2 - 8x$ is equal to zero. The set of roots is $\{0, -8, 1\}$.

QUESTION 96 What is the equation of the line that passes through the points (2, 3) and (-2, 5)?

- A. $y = x + 1$
 $y = -\frac{1}{2}x + 4$
 $y = -\frac{1}{2}x$
- B.
- C.
 $y = -\frac{3}{2}x$
 $y = -\frac{3}{2}x + 2$
- D.
- E.



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

First, find the slope of the line. The slope of a line is equal to the change in y values divided by the change in x values of two points on the line. The y value increases by $2 \times (5 - 3)$ and the x value decreases by $4 \times (-2 - 2)$. Therefore, the slope of the line is equal to $-2/4$ or $-1/2$. The equation of the line is $y = -\frac{1}{2}x + b$, where b is the y -intercept. Use either of the two given points to solve for b :

$$3 = -\frac{1}{2} \times 2 + b$$

$$3 = -1 + b$$

$$b = 4$$

The equation of the line that passes through the points (2, 3) and (-2, 5) is $y = -\frac{1}{2}x + 4$.

QUESTION 97

An empty crate weighs 8.16 kg and an orange weighs 220 g. If Jon can lift 11,000 g, how many oranges can he pack in the crate before lifting it onto his truck?

- A. 12
- B. 13
- C. 37
- D. 46
- E. 50

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The empty crate weighs 8.16 kg, or 8,160 g. If Jon can lift 11,000 g and one orange weighs 220 g, then the number of oranges that he can pack into the crate is equal to $\frac{11,000 - 8,160}{220} = \frac{2,840}{220} \approx 12.9$. Jon cannot pack a fraction of an orange. He can pack 12 whole oranges into the crate.

QUESTION 98 The measures of the length, width, and height of a rectangular prism are in the ratio 2:6:5. If the volume of the prism is 1,620 mm³, what is the width of the prism?

- A. 3 mm
- B. 6 mm
- C. 9 mm
- D. 18 mm
- E. 27 mm

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The volume of a prism is equal to lwh , where l is the length of the prism, w is the width of the prism, and h is the height of the prism:

$$2x \times 6x \times 5x = 1,620$$

$$60x^3 = 1,620$$

$$x^3 = 27 \quad x = 3$$

The length of the prism is $2 \times 3 = 6$ mm, the width of the prism is $6 \times 3 = 18$ mm, and the height of the prism is $5 \times 3 = 15$ mm.

QUESTION 99

A box contains five blue pens, three black pens, and two red pens. If every time a pen is selected, it is removed from the box, what is the probability of selecting a black pen followed by a blue pen?

- A. 1/6
- B. 1/10C. 1/50
- D. 3/20
- E. 77/90

Correct Answer: A

Section: (none)

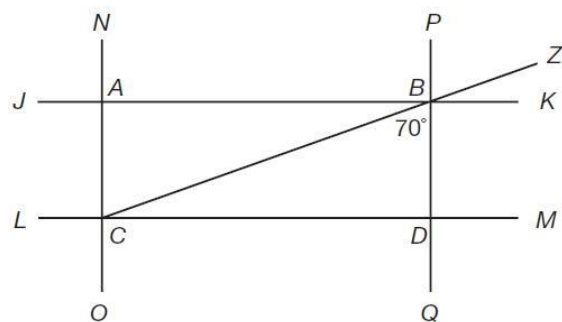
Explanation

Explanation/Reference:

Explanation:

At the start, there are $5 + 3 + 2 = 10$ pens in the box, 3 of which are black. Therefore, the probability of selecting a black pen is $\frac{3}{10}$. After the black pen is removed, there are nine pens remaining in the box, five of which are blue. The probability of selecting a blue pen second is $\frac{5}{9}$. To find the probability that both events will happen, multiply the probability of the first event by the probability of the second event: $\frac{3}{10} \times \frac{5}{9} = \frac{15}{90} = \frac{1}{6}$

QUESTION 100



In the diagram above, lines NO and PQ are parallel to each other and perpendicular to lines JK and LM. Line JK is parallel to line LM. If $\angle CBD$ is 70° , what is the measure of $\angle ZBK$?

- A. 10°
- B. 20°
- C. 70°
- D. 90°
- E. 110°

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$\angle CBD$ and $\angle PBZ$ are alternating angles – their measures are equal. $\angle PBZ = 70^\circ$. $\angle PBZ + \angle ZBK$ form $\angle PBK$. Line PQ is perpendicular to line JK; therefore, $\angle PBK$ is a right angle (90°). $\angle ZBK = \angle PBK - \angle PBZ = 90 - 70 = 20$.

QUESTION 101

Monica sells pretzels in the cafeteria every school day for a week. She sells 14 pretzels on Monday, 12 pretzels on Tuesday, 16 pretzels on Wednesday, and 12 pretzels on Thursday. Then, she calculates the mean, median, and mode of her sales. If she sells 13 pretzels on Friday, then: A. the mode will increase.

- B. the mean will stay the same.
- C. the median will stay the same.
- D. the median will decrease.
- E. the mean will increase.

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

For the first four days of the week, Monica sells 12 pretzels, 12 pretzels, 14 pretzels, and 16 pretzels. The median value is the average of the second and third values: $\frac{12+14}{2} = \frac{26}{2} = 13$. If Monica sells 13 pretzels on Friday, the median will still be 13. She will have sold 12 pretzels, 12 pretzels, 13 pretzels, 14 pretzels, and 16 pretzels. The median stays the same.

QUESTION 102

What is the tenth term of the pattern below?

$\frac{10}{1,024}$ $\frac{9}{512}$ $\frac{8}{256}$ $\frac{7}{128}$

- A. $\frac{1}{2}$
- B. $\frac{2}{9}$
- C. $\frac{9}{2}$
- D. $\frac{9}{4}$
- E. 1

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The denominator of each term in the pattern is equal to 2 raised to the power given in the numerator. The numerator decreases by 1 from one term to the next. Since 10 is the numerator of the first term, $10 - 9$, or 1, will be the numerator of the tenth term. $2^1 = 2$, so the tenth term will be $\frac{1}{2}$.

QUESTION 103 Which of the following statements is always true if p is a rational number?

$$|p| < |3p|$$

$$|p^2| > |p + 1|$$

$$|-p| > p$$

$$|p^3| > |p^2|$$

$$|p^{-p}| > p^{-p}$$

- A.
- B.
- C.
- D.
- E.



Correct Answer: A

Section: (none)

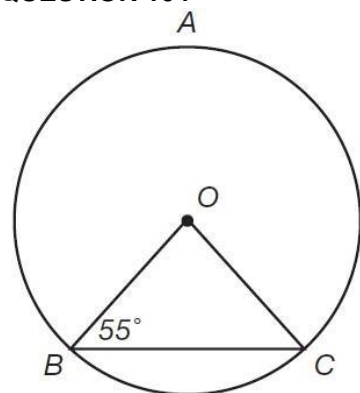
Explanation

Explanation/Reference:

Explanation:

No matter whether p is positive or negative, or whether p is a fraction, whole number, or mixed number, the absolute value of three times any number will always be positive and greater than the absolute value of that number.

QUESTION 104



In the diagram above, side $OB \cong$ side OC . Which of the following is the measure of minor arc BC?

- A. 27.5°
- B. 45° C. 55°
- D. 70°
- E. 110°

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Line OB \cong line OC, which means the angles opposite line OB and OC ($\angle C$ and $\angle B$) are congruent. Since $\angle B = 55^\circ$, then $\angle C = 55^\circ$. There are 180° in a triangle, so the measure of $\angle O$ is equal to $180 - (55 + 55) = 180 - 110 = 70^\circ$. $\angle O$ is a central angle. The measure of its intercepted arc, minor arc BC, is equal to the measure of $\angle O$, 70° .

QUESTION 105

If $g^h = \frac{2h}{g}$, then $(h^g)^h =$:

- A. $2h$
- B. $4h$
- C. $\frac{h^2}{g}$
- D. $\frac{2h^2}{g}$



Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

a is a function definition. a means "take the value after the a symbol, multiply it by 2, and divide it by the value before the a symbol." So, h^g is equal to two times the value after the a symbol (two times g) divided by the number before the a

symbol: $\frac{2g}{h}$. Now, take that value, the value of h^g , and substitute it for h^g in $(h^g)^h$: $\left(\frac{2g}{h}\right)^h$. Now, repeat the process. Two times the value after the a symbol (two times h) divided by the number before the symbol:
 $\frac{2h}{\frac{2g}{h}} = \frac{2h^2}{2g} = \frac{h^2}{g}$

QUESTION 106

Four copy machines make 240 total copies in three minutes. How long will it take five copy machines to make the same number of copies?

- A. 2 minutes
- B. 2 minutes, 15 seconds C. 2 minutes, 24 seconds D. 2 minutes, 45 seconds
- E. 3 minutes, 36 seconds

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

If four copy machines make 240 copies in three minutes, then five copy machines will make 240 copies in x minutes:

$$4 \times 240 \times 3 = 5 \times 240 \times x \quad 2,880 = 1,200x \quad x = 2.4$$

Five copy machines will make 240 copies in 2.4 minutes. Since there are 60 seconds in a minute, 0.4 of a minute is equal to $0.4 \times 60 = 24$ seconds. The copies will be made in 2 minutes, 24 seconds.

QUESTION 107 If 40% of j is equal to 50% of k , then j is:

- A. 10% larger than k .
- B. 15% larger than k .
- C. 20% larger than k .
- D. 25% larger than k .
- E. 80% larger than k .

Correct Answer: D

Section: (none)

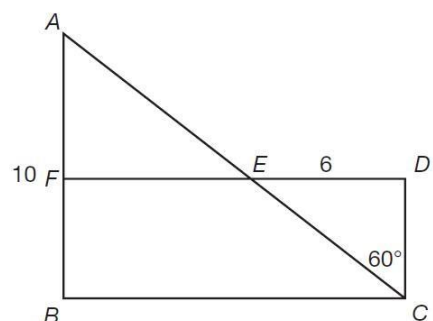
Explanation

Explanation/Reference:

Explanation:

40% of $j = 0.4 \times j$, 50% of $k = 0.5 \times k$. If $0.4 \times j = 0.5 \times k$, $1.25 \times k \times j$ is equal to 125% of k , which means that j is 25% larger than k .

QUESTION 108



In the diagram above, FDCB is a rectangle. Line ED is six units long, line AB is ten units long, and the measure of angle ECD is 60° . What is the length of line AE?

- A. 8
- B. $\frac{\sqrt{3}}{2}$
- C. 20
- D. $20 - \frac{\sqrt{3}}{2}$
- E. $20 - 4\sqrt{3}$

E.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

FDCB is a rectangle, which means that $\angle D$ is a right angle. $\angle ECD$ is 60° , which makes triangle EDC a 30-60-90 right triangle. The leg opposite the 60-degree angle is equal to $\sqrt{3}$ times the length of the leg opposite the 30-degree angle.

Therefore, the length of side DC is equal to $\frac{6}{\sqrt{3}}$, or $2\sqrt{3}$. The hypotenuse of a 30-60-90 right triangle is equal to twice the length of the leg opposite the 30-degree angle, so the length of EC is $2 \times 2\sqrt{3} = 4\sqrt{3}$. $\angle DCB$ is also a right angle, and triangle ABC is also a 30-60-90 right triangle. Since $\angle ECD = \angle ECB$ is 60° , $\angle ACB$ is equal to $90 - 60 = 30^\circ$. Therefore, the length of AC, the hypotenuse of triangle ABC, is twice the length of AB: $2 \times 10 = 20$. The length of AC is 20 and the length of EC is $4\sqrt{3}$. Therefore, the length of AE is $20 - 4\sqrt{3}$.

QUESTION 109

Which of the following could be equal to $\frac{x}{4x}$?

- A. $-1/4$
- B. $0/4$
- C. 0.20 D. $4/12$
- E. $5/20$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Divide the numerator and denominator of $\frac{x}{4x}$ by x , leaving $1/4$. Divide the numerator and denominator of $5/20$ by 5 . This fraction is also equal to $1/4$.

QUESTION 110

There are seven vocalists, four guitarists, four drummers, and two bassists in Glen Oak's music program, while there are five vocalists, eight guitarists, two drummers, and three bassists in Belmont's music program. If a band comprises one vocalist, one guitarist, one drummer, and one bassist, how many more bands can be formed in Belmont?

- A. 4
- B. 10 C. 16 D. 18
- E. 26

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Multiply the numbers of vocalists, guitarists, drummers, and bassists in each town to find the number of bands that can be formed in each town. There are $7 \times 4 \times 4 \times 2 = 224$ bands that can be formed in Glen Oak. There are $5 \times 8 \times 2 \times 3 = 240$ bands that can be formed in Belmont; $240 - 224 = 16$ more bands that can be formed in Belmont.

QUESTION 111 Which of the following is the equation of a parabola whose vertex is at $(5, -4)$?

- A. $y = (x - 5)^2 - 4$
- B. $y = (x + 5)^2 - 4$ C. $y = (x - 5)^2 + 4$
- D. $y = (x + 5)^2 + 4$
- E. $y = x^2 - 29$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The equation of a parabola with its turning point five units to the right of the y -axis is written as $y = (x - 5)^2$. The equation of a parabola with its turning point four units below the x -axis is written as $y = x^2 - 4$. Therefore, the equation of a parabola with its vertex at $(5, -4)$ is $y = (x - 5)^2 - 4$.

QUESTION 112 If $b^3 = -64$, then $b^2 - 3b - 4 =$:

- A. -6 .
- B. -4 .
- C. 0 .
- D. 24 .

E. 28.

Correct Answer: D

Section: (none)

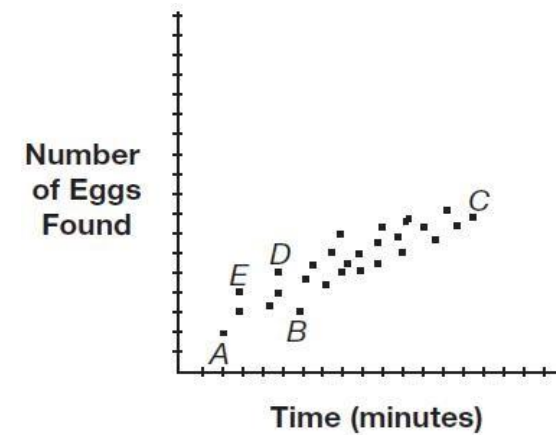
Explanation

Explanation/Reference:

Explanation:

If $b^3 = -64$, then, taking the cube root of both sides, $b = -4$. Substitute -4 for b in the second equation: $b^2 - 3b - 4 = (-4)^2 - 3 \times (-4) - 4 = 16 + 12 - 4 = 24$.

QUESTION 113



The scatter plot above shows how many eggs were found in a hunt over time. Which of the labeled points represents a number of eggs found that is greater than the number of minutes that has elapsed?

- A. A
- B. B
- C. C
- D. D
- E. E



Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The point that represents a number of eggs found that is greater than the number of minutes that has elapsed is the point that has a y value that is greater than its x value. Only point E lies farther from the horizontal axis than it lies from the vertical axis. At point E , more eggs have been found than the number of minutes that has elapsed.

QUESTION 114 The point $(6, -3)$ could be the midpoint of which of the following lines?

- A. a line with endpoints at $(0, -1)$ and $(12, -2)$
- B. a line with endpoints at $(2, -3)$ and $(6, 1)$
- C. a line with endpoints at $(6, 0)$ and $(6, -6)$
- D. a line with endpoints at $(-6, 3)$ and $(-6, -3)$
- E. a line with endpoints at $(3, 3)$ and $(12, -6)$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The midpoint of a line is equal to the average of the x-coordinates and the average of the y-coordinates of the endpoints of the line. The midpoint of the line with endpoints at (6, 0) and (6, -6) is $\left(\frac{6+6}{2}, \frac{0+(-6)}{2}\right) = \left(\frac{12}{2}, -\frac{6}{2}\right) = (6, -3)$.

QUESTION 115 A sack contains red, blue, and yellow marbles. The ratio of red marbles to blue marbles to yellow marbles is 3:4:8. If there are 24 yellow marbles in the sack, how many total marbles are in the sack?

- A. 45
- B. 48
- C. 72
- D. 96
- E. 144

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The number of yellow marbles, 24, is $24 \div 8 = 3$ times larger than the number of marbles given in the ratio. Multiply each number in the ratio by 3 to find the number of each color of marbles. There are $3 \times 3 = 9$ red marbles and $4 \times 3 = 12$ blue marbles. The total number of marbles in the sack is $24 + 9 + 12 = 45$.

QUESTION 116

What two values are not in the domain of $y = \frac{x^2-36}{x^2-9x-36}$?

- A. -3, 12
- B. 3, -12
- C. -6, 6
- D. -6, 36
- E. 9, 36

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The equation $y = \frac{x^2-36}{x^2-9x-36}$ is undefined when its denominator, $x^2 - 9x - 36$, evaluates to zero. The x values that make the denominator evaluate to zero are not in the domain of the equation. Factor $x^2 - 9x - 36$ and set the factors equal to zero: $x^2 - 9x - 36 = (x - 12) \times (x + 3)$; $x - 12 = 0$, $x = 12$; $x + 3 = 0$, $x = -3$.

QUESTION 117 The diagonal of one face of a cube measures $4\sqrt{2}$ in. What is the volume of the cube?

- A. $24\sqrt{2} \text{ in}^3$
- B. 64 in^3
- C. 96 in^3
- D. $128\sqrt{2} \text{ in}^3$
- E. 192 in^3

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Every face of a cube is a square. The diagonal of a square is equal to $S\sqrt{2}$, where S is the length of a side of the square. If $S\sqrt{2} = 4\sqrt{2}$, then one side, or edge, of the cube is equal to 4 in. The volume of a cube is equal to e^3 , where e is the length of an edge of the cube. The volume of the cube is equal to $(4 \text{ in})^3 = 64 \text{ in}^3$.

QUESTION 118

A line has a y-intercept of -6 and an x-intercept of 9 . Which of the following is a point on the line?

- A. $(-6, -10)$
- B. $(1, 3)$
- C. $(0, 9)$
- D. $(3, -8)$
- E. $(6, 13)$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

A line with a y-intercept of -6 passes through the point $(0, -6)$ and a line with an x-intercept of 9 passes through the point $(9, 0)$. The slope of a line is equal to the change in y values between two points on the line divided by the change in the x values of those points. The slope of this line is equal to $\frac{0 - (-6)}{9 - 0} = \frac{6}{9} = \frac{2}{3}$. The equation of the line that has a slope of $\frac{2}{3}$ and a y-intercept of -6 is $y = \frac{2}{3}x - 6$. When $x = -6$, y is equal to $\frac{2}{3} \times (-6) - 6 = -4 - 6 = -10$; therefore, the point $(-6, -10)$ is on the line $y = \frac{2}{3}x - 6$.

QUESTION 119 If $m < n < 0$, then all of the following are true EXCEPT:

- A. $-m < -n$.
- B. $mn > 0$.
- C. $|m| + n > 0$.
- D. $|n| < |m|$.
- E. $m - n < 0$.

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If $m < n < 0$, then m and n are both negative numbers, and m is more negative than n . Therefore, $-m$ will be more positive (greater) than $-n$, so the statement $-m < -n$ cannot be true.

QUESTION 120

The area of a circle is equal to four times its circumference. What is the circumference of the circle?

- A. π units
- B. 16π units
- C. 48π units
- D. 64π units
- E. Cannot be determined.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If r is the radius of this circle, then the area of this circle, πr^2 , is equal to four times its circumference, $2\pi r$. $\pi r^2 = 4 \times 2\pi r$, $\pi r^2 = 8\pi r$, $r^2 = 8r$, $r = 8$ units. If the radius of the circle is eight units, then its circumference is equal to $2\pi \times 8 = 16\pi$ units.

QUESTION 121

If the statement "All students take the bus to school" is true, then which of the following must be true?

- A. If Courtney does not take the bus to school, then she is not a student.
- B. If Courtney takes the bus to school, then she is a student.
- C. If Courtney is not a student, then she does not take the bus.
- D. All of the above.
- E. None of the above.

Correct Answer: A

Section: (none)

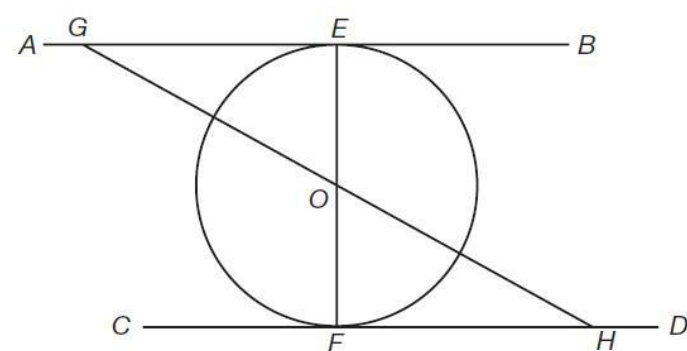
Explanation

Explanation/Reference:

Explanation:

Since all students take the bus to school, anyone who does not take the bus cannot be a student. If Courtney does not take the bus to school, then she cannot be a student. However, it is not necessarily true that everyone who takes the bus to school is a student, nor is it necessarily true that everyone who is not a student does not take the bus. The statement “All students take the bus to school” does not, for instance, preclude the statement “Some teachers take the bus to school” from being true.

QUESTION 122



In the diagram above, line AB is parallel to line CD, both lines are tangents to circle O and the diameter of circle O is equal in measure to the length of line OH. If the diameter of circle O is 24 in, what is the measure of $\angle BGH$?

- A. 30°
- B. 45°
- C. 60°
- D. 75°
- E. Cannot be determined.

Correct Answer: A

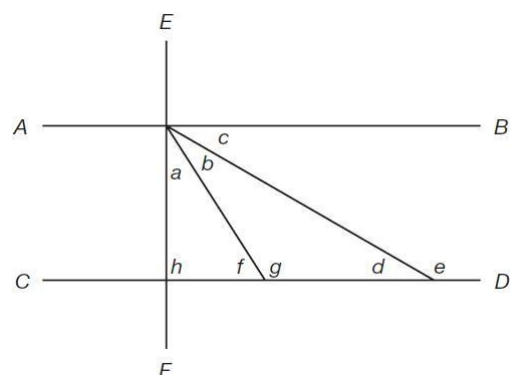
Section: (none)

Explanation

Explanation/Reference:

Explanation:

Lines OF and OE are radii of circle O and since a tangent and a radius form a right angle, triangles OFH and OGE are right triangles. If the length of the diameter of the circle is 24 in, then the length of the radius is 12 in. The sine of $\angle OHF$ is equal to $12/24$, or $1/2$. The measure of an angle with a sine of $1/2$ is 30° . Therefore, $\angle OHF$ measures 30° . Since $\angle BGH$ and $\angle OHF$ are alternate angles, they are equal in measure. Therefore, $\angle BGH$ also measures 30° . **QUESTION 123**



In the diagram above, if line AB is parallel to line CD, and line EF is perpendicular to lines AB and CD, all of the following are true EXCEPT:

- A. $e = a + b + 90$.
- B. $a + h + f = b + g + d$.
- C. $a + h = g$.
- D. $a + b + d = 90$.
- E. $c + b = g$.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Since AB and CD are parallel lines cut by a transversal, $\angle f$ is equal to the sum of $\angle c$ and $\angle b$. However, $\angle f$ and $\angle g$ are not equal – they are supplementary. Therefore, the sum of $\angle c$ and $\angle b$ is also supplementary – and not equal – to g .

QUESTION 124

If the lengths of the edges of a cube are decreased by 20%, the surface area of the cube will decrease by:

- A. 20%.
- B. 36%.
- C. 40%.
- D. 51%.
- E. 120%.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The surface area of a cube is equal to $6e^2$, where e is the length of an edge of a cube. The surface area of a cube with an edge equal to one unit is 6 cubic units. If the lengths of the edges are decreased by 20%, then the surface area becomes

$$6 \times \left(\frac{4}{5}\right)^2 = \frac{96}{25} \text{ cubic units, a decrease of } \frac{6 - \frac{96}{25}}{6} = \frac{\frac{54}{25}}{6} = \frac{9}{25} = \frac{36}{100} = 36\%$$

QUESTION 125 Simon plays a video game four times. His game scores are 18 points, 27 points, 12 points, and 15 points. How many points must Simon score in his fifth game in order for the mean, median, and mode of the five games to equal each other?

- A. 12 points
- B. 15 points
- C. 18 points
- D. 21 points
- E. 27 points

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

For the median and mode to equal each other, the fifth score must be the same as one of the first four, and, it must fall in the middle position when the five scores are ordered. Therefore, Simon must have scored either 15 or 18 points in his fifth game. If he scored 15 points, then his mean score would have been greater than 15: 17.4. Simon scored 18 points in his fifth game, making the mean, median, and mode for the five games equal to 18.

QUESTION 126 If $g \times 1/4 = 16$,
then $g \times (-1/5)$:

- A. $1/4$

- B. $\frac{1}{8}$
 C. $\frac{16}{5}$
 D. 4E. 8

Correct Answer: A

Section: (none)

Explanation

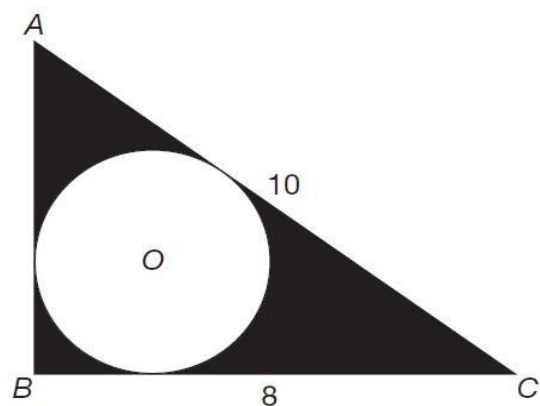
Explanation/Reference:

Explanation:

To go from $g \times \frac{2}{5}$ to $g \times (-\frac{1}{5})$, you would multiply the exponent of $g \times \frac{2}{5}$ by $(-\frac{1}{2})$.

Therefore, to go from 16 (the value of $g \times \frac{2}{5}$ to the value of $g \times (-\frac{1}{5})$ multiply the exponent of 16 by $(-\frac{1}{2})$. The exponent of 16 is one, so the value of $g \times (-\frac{1}{5}) = 16$ to the $(-\frac{1}{2})$ power, which is $\frac{1}{4}$.

QUESTION 127



In the diagram above, triangle ABC is a right triangle and the diameter of circle O is $\frac{2}{3}$ the length of AB. Which of the following is equal to the shaded area?

- A. 20π square units
 B. $24 - 4\pi$ square units
 C. $24 - 16\pi$ square units
 D. $48 - 4\pi$ square units
 E. $48 - 16\pi$ square units

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Since ABC is a right triangle, the sum of the squares of its legs is equal to the square of the hypotenuse: $(AB)^2 + 8^2 = 10^2$, $(AB)^2 + 64 = 100$, $(AB)^2 = 36$, $AB = 6$ units. The diameter of circle O is $\frac{2}{3}$ of AB, or $\frac{2}{3} \times 6 = 4$ units. The area of a triangle is equal to $\frac{1}{2}bh$, where b is the base of the triangle and h is the height of the triangle. The area of ABC = $\frac{1}{2} \times 6 \times 8 = 24$ square units. The area of a circle is equal to πr^2 , where r is the radius of the circle. The radius of a circle is equal to half the diameter of the circle, so the radius of O is $\frac{1}{2} \times 4 = 2$ units. The area of circle O = $\pi 2^2 = 4\pi$. The shaded area is equal to the area of the triangle minus the area of the circle: $24 - 4\pi$ square units.

QUESTION 128 In a restaurant, the ratio of four-person booths to two-person booths is 3:5. If 154 people can be seated in the restaurant, how many two-person booths are in the restaurant?

- A. 14
 B. 21
 C. 35
 D. 57
 E. 70

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Let $3x$ equal the number of four-person booths and let $5x$ equal the number of two-person booths. Each four-person booth holds four people and each two-person booth holds two people. Therefore, $3x \times 4 + 5x \times 2 = 154$, $12x + 10x = 154$, $22x = 154$, $x = 7$. There are $7 \times 3 = 21$ four-person booths and $7 \times 5 = 35$ two-person booths.

QUESTION 129 If $y = -x^3 + 3x - 3$, what is the value of y when $x = -3$?

- A. -35
- B. -21
- C. 15 D. 18
- E. 33

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Substitute -3 for x and solve for y :

$$y = (-3)^3 + 3(-3) - 3$$

$$y = -(-27) - 9 - 3$$

$$y = 27 - 12$$

$$y = 15$$

QUESTION 130

What is the tenth term of the sequence: 5, 15, 45, 135, ... ?

- A. 5^{10}
- B. $\frac{3^{10}}{5}$
- C. $(5 \times 3)^9$
- D. 5×3^9
- E. 5×3^{10}



Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The first term in the sequence is equal to 5×3^0 , the second term is equal to 5×3^1 , and so on. Each term in the pattern is equal to $5 \times 3n^{-1}$, where n is the position of the term in the pattern. The tenth term in the pattern is equal to $5 \times 3^{(10-1)}$, or 5×3^9 .

QUESTION 131

Wendy tutors math students after school every day for five days. Each day, she tutors twice as many students as she tutored the previous day. If she tutors t students the first day, what is the average (arithmetic mean) number of students she tutors each day over the course of the week?

- A. t
- B. $5t$
- C. $6t$
- D. $\frac{t^5}{5}$
- E. $\frac{31t}{5}$

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:

Explanation:

If Wendy tutors t students the first day, then she tutors $2t$ students the second day, $4t$ students the third day, $8t$ students the fourth day, and $16t$ students the fifth day. The average number of students tutored each day over the course of the

week is equal to the sum of the tutored students divided by the number of days: $\frac{t+2t+4t+8t+16t}{5} = \frac{31t}{5}$.

QUESTION 132

A pair of Jump sneakers costs \$60 and a pair of Speed sneakers costs \$45. For the two pairs of sneakers to be the same price

- A. the price of a pair of Jump sneakers must decrease by 15%.
- B. the price of a pair of Speed sneakers must increase by 15%.
- C. the price of a pair of Jump sneakers must decrease by 25%.
- D. the price of a pair of Speed sneakers must increase by 25%.
- E. the price of a pair of Jump sneakers must decrease by 33%.

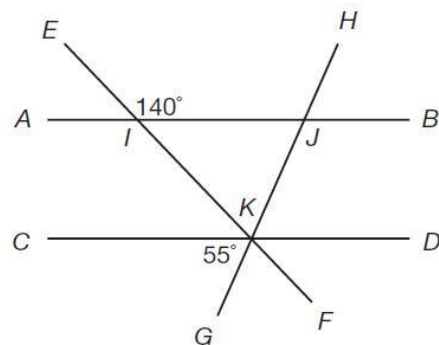
Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Jump sneakers cost $\$60 - \$45 = \$15$ more, or $15/45 = 33\%$ more than Speed sneakers. Speed sneakers cost \$15 less, or $15/60 = 25\%$ less than Jump sneakers. For the two pairs of sneakers to be the same price, either the price of Speed sneakers must increase by 33% or the price of Jump sneakers must decrease by 25%.

QUESTION 133



In the diagram above, line AB is parallel to line CD, $\angle EIJ$ measures 140° and $\angle CKG$ measures 55° . What is the measure of $\angle IKJ$?

- A. 40°
- B. 55°
- C. 85°
- D. 95°
- E. 135°

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Since AB and CD are parallel lines cut by transversals EF and GH respectively, $\angle CKG$ and $\angle IJK$ are alternate angles. Alternate angles are equal in measure, so $\angle IJK = 55^\circ$. $\angle EIJ$ and $\angle JIK$ form a line. They are supplementary and their measures sum to 180° . $\angle IJK = 180 - 140 = 40^\circ$, and $\angle IJK$ and $\angle IKJ$ comprise a triangle. There are 180° in a triangle; therefore, the measure of $\angle IKJ = 180 - (55 + 40) = 85^\circ$.

QUESTION 134 A number cube is labeled with the numbers one through six, with one number on each side of the cube. What is the probability of rolling either a number that is even or a number that is a factor of 9?

- A. $\frac{1}{3}$
- B. $\frac{1}{2}$
- C. $\frac{2}{3}$
- D. $\frac{5}{6}$
- E. 1

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

There are three numbers on the cube that are even (2, 4, 6), so the probability of rolling an even number is $\frac{1}{2}$. There are two numbers on the cube that are factors of 9 (1, 3), so the probability of rolling a factor of 9 is $\frac{2}{6}$ or $\frac{1}{3}$. No numbers are members of both sets, so to find the probability of rolling either a number that is even or a number that is a factor of 9, add the probability of each event: $\frac{1}{2} + \frac{1}{3} = \frac{3}{6} + \frac{2}{6} = \frac{5}{6}$.

QUESTION 135

The area of one square face of a rectangular prism is 121 square units. If the volume of the prism is 968 cubic units, what is the surface area of the prism?

- A. 352 square units
- B. 512 square units
- C. 528 square units
- D. 594 square units
- E. 1,452 square units

Correct Answer: D

Section: (none)

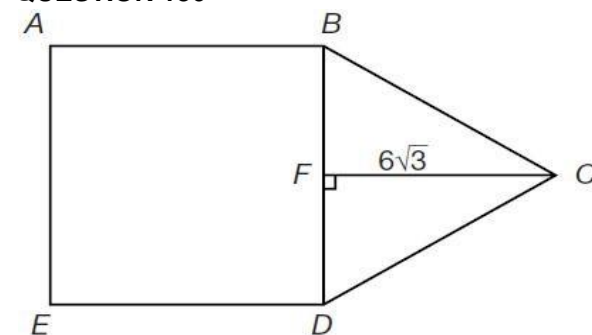
Explanation

Explanation/Reference:

Explanation:

The area of a square is equal to the length of a side, or edge, of the square times itself. If the area of a square face is 121 square units, then the lengths of two edges of the prism are 11 units. The volume of the prism is 968 cubic units. The volume of prism is equal to lwh , where l is the length of the prism, w is the width of the prism, and h is the height of the prism. The length and width of the prism are both 11 units. The height is equal to: $968 = 11 \times 11 \times h$, $968 = 121 \times h$, $h = 8$. The prism has two square faces and four rectangular faces. The area of one square face is 121 square units. The area of one rectangular face is $8 \times 11 = 88$ square units. Therefore, the total surface area of the prism is equal to: $2 \times 121 + 4 \times 88 = 242 + 352 = 594$ square units.

QUESTION 136



In the diagram above, ABDE is a square and BCD is an equilateral triangle. If $FC = 6\sqrt{3}$ cm, what is the perimeter of ABCDE?

- $30\sqrt{3}$
- $36\sqrt{3}$
- A. cm
- B. cm
- C. 60 cm
- D. $60\sqrt{3}$ cm

E. 84 cm

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Since BCD is an equilateral triangle, $\angle CBD$, $\angle BDC$ and $\angle BCD$ all measure 60° . FCD and BCF are both 30-60-90 right triangles that are congruent to each other. The side opposite the 60-degree angle of triangle BCF, side FC, is equal to $\sqrt{3}$ times the length of the side opposite the 30-degree angle, side BF. Therefore, BF is equal to 6 cm. The hypotenuse, BC, is equal to twice the length of side BF. The length of BC is $2 \times 6 = 12$ cm. Since BC = 12 cm, CD and BD are also 12 cm. BD is one side of square ABDE; therefore, each side of ABDE is equal to 12 cm. The perimeter of ABCDE = 12 cm + 12 cm + 12 cm + 12 cm + 12 cm = 60 cm.

QUESTION 137

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What is the value of $(3xy + \frac{x}{y})^{\frac{x}{y}}$ when $x = 2$ and $y = 5$?

Correct Answer: 4

Section: (none)

Explanation

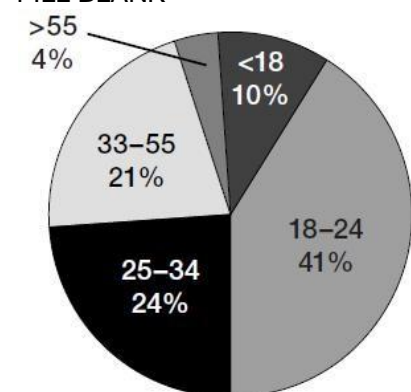
Explanation/Reference:

Explanation:

Substitute 2 for x and 5 for y. $(3xy + \frac{x}{y})^{\frac{x}{y}} = (3 \times 2 \times 5 + 2)^{\frac{2}{5}} = 32^{\frac{2}{5}} = (\sqrt[5]{32})^2 = 2^2 = 4$. Or, $3 \times 2 \times 5 = 30$, $30 + 2 = 32$, the 5th root of 32 is 2, 2 raised to the 2nd power is 4.

QUESTION 138

FILL BLANK



The diagram above shows the breakdown by age of the 1,560 people who attended the Spring Island Concert last weekend. How many people between the ages of 18 and 34 attended the concert?

Correct Answer: 1,014

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Of the concert attendees, 41% were between the ages of 18–24 and 24% were between the ages of 25–34. Therefore, $41 + 24 = 65\%$ of the attendees, or $1,560 \times 0.65 = 1,014$ people between the ages of 18 and 34 attended the concert.

QUESTION 139

FILL BLANK

Matt weighs $\frac{3}{5}$ of Paul's weight. If Matt were to gain 4.8 pounds, he would weigh $\frac{2}{3}$ of Paul's weight. What is Matt's weight in pounds?

Correct Answer: 43.2

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Matt's weight, m , is equal to $\frac{3}{5}$ of Paul's weight, p : $m = \frac{3}{5}p$. If 4.8 is added to m , the sum is equal to $\frac{2}{3}$ of p : $m + 4.8 = \frac{2}{3}p$. Substitute the value of m into the second equation: $\frac{3}{5}p + 4.8 = \frac{2}{3}p$, $\frac{1}{15}p = 4.8$, $p = 72$. Paul weighs 72 pounds, and Matt weighs $\frac{3}{5} \times 72 = 43.2$ pounds.

QUESTION 140

FILL BLANK

If $-6b + 2a - 25 = 5$ and $\frac{a}{b} + 6 = 4$, what is the value of $\left(\frac{b}{a}\right)^2$?

Correct Answer: 1/4

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Solve $-6b + 2a - 25 = 5$ for a in terms of b : $-6b + 2a - 25 = 5$, $-3b + a = 15$, $a = 15 + 3b$. Substitute a in terms of b into the second equation: $\frac{15+3b}{b} + 6 = 4$, $\frac{15}{b} + 3 + 6 = 4$, $\frac{15}{b} = -5$, $b = -3$. Substitute b into the first equation to find the value of a : $-6b + 2a - 25 = 5$, $-6 \times (-3) + 2a - 25 = 5$, $18 + 2a = 30$, $2a = 12$, $a = 6$. Finally, $\left(\frac{b}{a}\right)^2 = \left(\frac{-3}{6}\right)^2 = \left(-\frac{1}{2}\right)^2 = \frac{1}{4}$.

QUESTION 141

FILL BLANK

The function $j(k) = \left(\frac{j}{k}\right)^j$. If $j(k) = -8$ when $j = -3$, what is the value of k ?

Correct Answer: 6

Section: (none)

Explanation

Explanation/Reference:

Explanation: $j(k) = -8$

when $j = -3$ then:

$$-8 = \left(\frac{-3}{k}\right)^3$$

$$-8 = \left(\frac{k}{-3}\right)^3$$

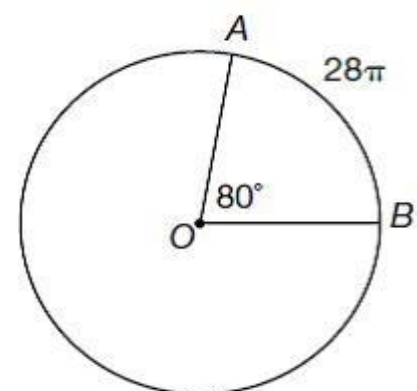
$$-8 = \frac{k^3}{27}$$

$$216 = k^3$$

$$k = 6$$

QUESTION 142

FILL BLANK



In the circle above, the measure of $\angle AOB$ is 80° and the length of arc AB is 28π units. What is the radius of the circle?

Correct Answer: 63

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The size of an intercepted arc is equal to the measure of the intercepting angle divided by 360, multiplied by the circumference of the circle ($2\pi r$, where r is the radius of the circle): $28\pi = \frac{80}{360} \times 2\pi r$, $28 = \frac{4}{9}r$, $r = 63$ units.

QUESTION 143

FILL BLANK

What is the distance from the point where the line given by the equation $3y = 4x + 24$ crosses the x -axis to the point where the line crosses the y -axis?

Correct Answer: 10

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Write the equation in slope-intercept form ($y = mx + b$): $3y = 4x + 24$, $y = \frac{4}{3}x + 8$. The line crosses the y -axis at its y -intercept, (0, 8). The line crosses the x -axis when $y = 0$: $y = \frac{4}{3}x + 8 = 0$, $\frac{4}{3}x = -8$, $x = -6$. Use the distance formula to find the distance from (0, 8) to (-6, 0):

$$distance = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$distance = \sqrt{((-6) - 0)^2 + (0 - 8)^2}$$

$$distance = \sqrt{6^2 + (-8)^2}$$

$$distance = \sqrt{36 + 64}$$

$$distance = \sqrt{100}$$

Distance is 10 units.

QUESTION 144

FILL BLANK

For any whole number $x > 0$, how many elements are in the set that contains only the numbers that are multiples AND factors of x ?

Correct Answer: 1

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The largest factor of a positive, whole number is itself, and the smallest multiple of a positive, whole number is itself. Therefore, the set of only the factors and multiples of a positive, whole number contains one element – the number itself.

QUESTION 145

FILL BLANK

A bus holds 68 people. If there must be one adult for every four children on the bus, how many children can fit on the bus?

Correct Answer: 52

Section: (none)

Explanation

Explanation/Reference:

Explanation:

There is one adult for every four children on the bus. Divide the size of the bus, 68, by 5: $68 \div 5 = 13.6$. There can be no more than 13 groups of one adult, four children. Therefore, there can be no more than 13 groups \times 4 children in a group = 52 children on the bus.

QUESTION 146

FILL BLANK

In Marie's fish tank, the ratio of guppies to platies is 4:5. She adds nine guppies to her fish tank and the ratio of guppies to platies becomes 5:4. How many guppies are in the fish tank now?

Correct Answer: 25

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If the original ratio of guppies, g , to platies, p , is 4:5, then $g = 4/5p$. If nine guppies are added, then the new number of guppies, $g + 9$, is equal to $5/4p$: $g + 9 = 5/4p$. Substitute the value of g in terms of p from the first equation: $4/5p + 9 = 5/4p$, $9 = 9/20p$, $p = 20$. There are 20 platies in the fish tank and there are now $20 \times 5/4 = 25$ guppies in the fish tank.

QUESTION 147 The line $y = -2x + 8$ is:

- A. parallel to the line $y = 1/2x + 8$.
- B. parallel to the line $1/2y = -x + 3$.
- C. perpendicular to the line $2y = -1/2x + 8$.
- D. perpendicular to the line $1/2y = -2x - 8$.
- E. perpendicular to the line $y = 2x - 8$.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Parallel lines have the same slope. When an equation is written in the form $y = mx + b$, the value of m (the coefficient of x) is the slope. The line $y = -2x + 8$ has a slope of -2 . The line $1/2y = -x + 3$ is equal to $y = -2x + 6$. This line has the same slope as the line $y = -2x + 8$; therefore, these lines are parallel.

QUESTION 148

It takes six people eight hours to stuff 10,000 envelopes. How many people would be required to do the job in three hours?

- A. 4
- B. 12C. 16 D. 18
- E. 24

Correct Answer: C

Section: (none)

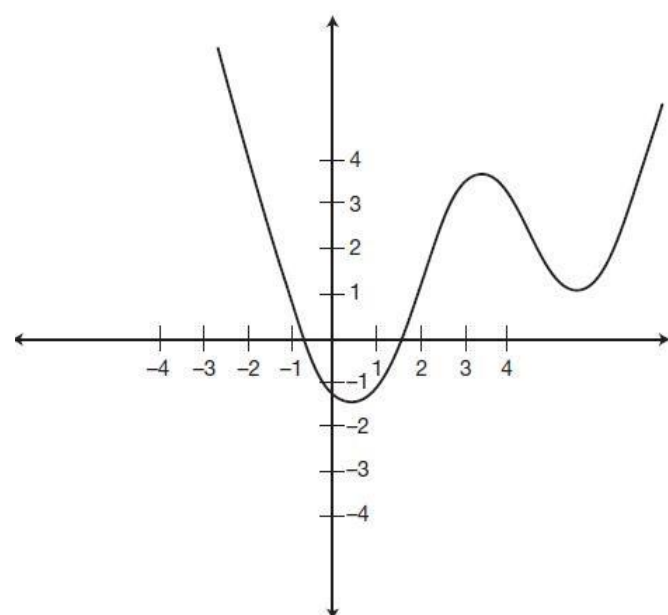
Explanation

Explanation/Reference:

Explanation:

Six people working eight hours produce $6 \times 8 = 48$ work-hours. The number of people required to produce 48 work-hours in three hours is $48 \div 3 = 16$.

QUESTION 149



In the diagram above of $f(x)$, for how many values does $f(x) = -1$?

- A. 0
- B. 1
- C. 2
- D. 3
- E. 4

Correct Answer:
C

Section: (none)
Explanation

Explanation/Reference:

Explanation:

The function $f(x)$ is equal to -1 every time the graph of $f(x)$ crosses the line $y = -1$. The graph of $f(x)$ crosses $y = -1$ twice; therefore, there are two values for which $f(x) = -1$.

QUESTION 150

The equation $\frac{x^2}{4} - 3x = -8$ when $x =$:

- A. -8 or 8 .
- B. -4 or 4 .
- C. -4 or -8 .
- D. 4 or -8 .
- E. 4 or 8 .

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Write the equation in quadratic form and find its roots:

$$\frac{x^2}{4} - 3x = -8$$

$$\begin{aligned}
 x^2 - 12x &= -32 \\
 x^2 - 12x + 32 &= 0 \\
 (x - 4)(x - 8) &= 0 \\
 x - 4 = 0 \quad x - 8 = 0 \\
 x = 4 \quad x = 8
 \end{aligned}$$

when x is either 4 or 8.

QUESTION 151

The expression $\frac{x^2 - 16}{x^3 + x^2 - 20x}$ can be reduced to:

$$\begin{aligned}
 &\frac{4}{x+5} \\
 &\frac{x+4}{x} \\
 &\frac{x+4}{x+5} \\
 &\frac{x+4}{x^2+5x} \\
 &-\frac{16}{x^3-20x}
 \end{aligned}$$

- A.
- B.
- C.
- D.
- E.



Correct Answer: D

Section: (none)

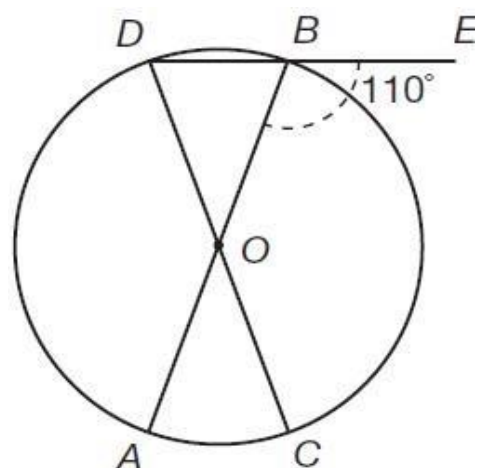
Explanation

Explanation/Reference:

Explanation:

Factor the numerator and denominator: $x^2 - 16 = (x + 4)(x - 4)$ and $x^3 + x^2 - 20x = x(x + 5)(x - 4)$. Cancel the $(x - 4)$ terms that appear in the numerator and denominator. The fraction becomes $\frac{x+4}{x(x+5)}$, or $\frac{x+4}{x^2+5x}$.

152



In the diagram above, if $\angle OBE$ measures 110° , what is the measure of arc AC?

- A. 20°
- B. 40°
- C. 55°
- D. 80°
- E. Cannot be determined.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference: Explanation: form a line. Since there are 180° in a line, the measure of $\angle BOE$ is $180 - 110 = 70^\circ$. OB and DO are radii, which makes triangle DBO isosceles, and $\angle ODB$ and $\angle DBO$ are congruent. Since $\angle DBO$ is 70° , $\angle ODB$ and $\angle DBO$ is also 70° . $\angle DOB$ is also $180 - (70 + 70) = 180 - 140 = 40^\circ$. and $\angle DOB$ and $\angle AOC$ are vertical angles, so the measure of $\angle AOC$ is also 40° . $\angle AOC$ is a central angle, so its intercepted arc, AC, also measures 40° . 70° , and $\angle DOB$

QUESTION 153

The volume of a cylinder is 486π cubic units. If the height of the cylinder is six units, what is the total area of the bases of the cylinder?

- A. 9π square units
- B. 18π square units
- C. 27π square units
- D. 81π square units
- E. 162π square units

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The volume of a cylinder is equal to $\pi r^2 h$, where r is the radius of the cylinder and h is the height of the cylinder. If the height of a cylinder with a volume of 486π cubic units is six units, then the radius is equal to: $486\pi =$

$$\pi r^2 \times 6$$

$$486 = 6r^2$$

$$81 = r^2$$

$$r = 9$$

A cylinder has two circular bases. The area of a circle is equal to πr^2 , so the total area of the bases of the cylinder is equal to $2\pi r^2$, or $2\pi \times 9^2 = 2\pi \times 81 = 162\pi$ square units.

QUESTION 154

If $a\sqrt{20} = \frac{2\sqrt{180}}{a}$, then $a =$ ____.

$$2\sqrt{3}$$

$$\sqrt{5}$$

A.

B.

C. 5

$$\sqrt{6}$$

D.

E. 6

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Cross multiply:

$$a\sqrt{20} = \frac{2\sqrt{180}}{a}$$

$$a^2\sqrt{20} = 2\sqrt{180}$$

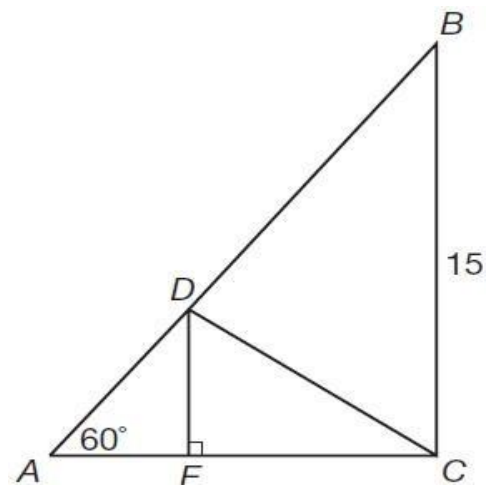
$$a^2\sqrt{4}\sqrt{5} = 2\sqrt{36}\sqrt{5}$$

$$2a^2\sqrt{5} = 12\sqrt{5}$$

$$a^2 = 6$$

$$a = \sqrt{6}$$

QUESTION 155



In the diagram above, ABC and DEC are right triangles, the length of side BC is 15 units, and the measure of $\angle A$ is 60° . If $\angle A$ is congruent to $\angle EDC$, what is the length of side DC?

- A. $\sqrt{15}$ units
- B. $15/2$ units
- C. $15/2 \times \sqrt{3}$ units
- D. 9 units
- E. $15\sqrt{3}$ units

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Since triangle DEC is a right triangle, triangle AED is also a right triangle, with a right angle at AED. There are 180° in a triangle, so the measure of $\angle ADE$ is $180 - (60 + 90) = 30^\circ$. $\angle A$ and $\angle EDC$ are congruent, so $\angle EDC$ is also 60° . Since there are 180° in a line, $\angle BDC$ must be 90° , making triangle BDC a right triangle. Triangle ABC is a right triangle with $\angle A$ measuring 60° , which means that $\angle B$ must be 30° , and BDC must be a 30-60-90 right triangle. The leg opposite the 30-degree angle in a 30-60-90 right triangle is half the length of the hypotenuse. Therefore, the length of DC is $15/2$ units.

QUESTION 156 If q is decreased by p percent, then the value of q is now:

- A. $q - p$
- B. $q - p/100$
- C. $-pq/100$
- D. $q - pq/100$
- E. $pq - pq/100$

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

p percent of q is equal to $q \times p/100$, or $pq/100$. If q is decreased by this amount, then the value of q is $pq/100$ less than q , or $q - pq/100$. **QUESTION**

157

The product of $\left(\frac{a}{b}\right)^2 \times \left(\frac{b}{a}\right)^{-2} \times \left(\frac{1}{a}\right)^{-1} =$:

- A. a
- B. $1/a$ C. a^3/b^4 D. a^4/b^4
- E. a^5/b^4

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

Explanation:

A fraction with a negative exponent can be rewritten as a fraction with a positive exponent by switching the numerator with the denominator.

$$\left(\frac{a}{b}\right)^2 \times \left(\frac{b}{a}\right)^{-2} \times \left(\frac{1}{a}\right)^{-1} = \left(\frac{a}{b}\right)^2 \times \left(\frac{a}{b}\right)^2 \times \left(\frac{a}{1}\right)^1 = \frac{a^2}{b^2} \times \frac{a^2}{b^2} \times a = \frac{a^5}{b^4}$$

QUESTION 158

Gil drives five times farther in 40 minutes than Warrick drives in 30 minutes. If Gil drives 45 miles per hour, how fast does Warrick drive?

- A. 6 mph
- B. 9 mph
- C. 12 mph D. 15 mph
- E. 30 mph

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If d is the distance Warrick drives and s is the speed Warrick drives, then $30s = d$. Gil drives five times farther, $5d$, in 40 minutes, traveling 45 miles per hour: $5d = 40 \times 45$. Substitute the value of d in terms of s into the second equation and solve for s , Warrick's speed: $5 \times 30s = 40 \times 45$, $150s = 1,800$, $s = 12$. Warrick drives 12 mph.

QUESTION 159 A bank contains one penny, two quarters, four nickels, and three dimes. What is the probability of selecting a coin that is worth more than five cents but less than 30 cents?

- A. $1/5$ B. $1/4$
- C. $1/2$
- D. $7/10$
- E. $9/10$

Correct Answer: C

Section: (none)

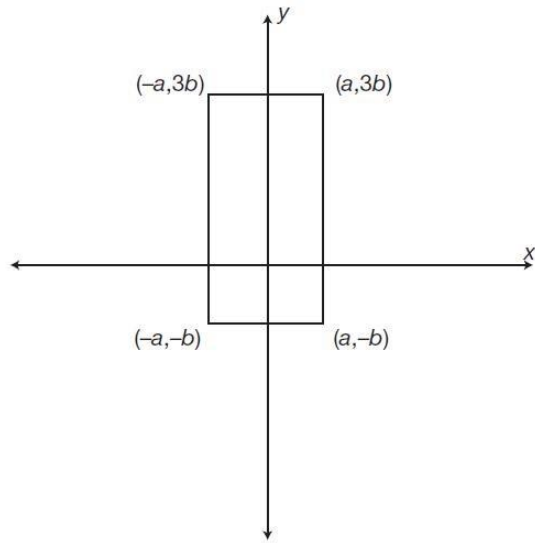
Explanation

Explanation/Reference:

Explanation:

There are ten coins in the bank (1 penny + 2 quarters + 4 nickels + 3 dimes). The two quarters and three dimes are each worth more than five cents but less than 30 cents, so the probability of selecting one of these coins is $\frac{5}{10}$ or $\frac{1}{2}$.

QUESTION 160



In the diagram above, what is the area of the rectangle?

- A. $6ab$ square units
- B. $8ab$ square units
- C. $9b^2$ square units
- D. $12ab$ square units
- E. $16b$ square units



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

The y -axis divides the rectangle in half. Half of the width of the rectangle is a units to the left of the y -axis and the other half is a units to the right of the y -axis. Therefore, the width of the rectangle is $2a$ units. The length of the rectangle stretches from $3b$ units above the x -axis to b units below the x -axis. Therefore, the length of the rectangle is $4b$ units. The area of a rectangle is equal to lw , where l is the length of the rectangle and w is the width of the rectangle. The area of this rectangle is equal to $2a \times 4b = 8ab$ square units.

QUESTION 161

If set M contains only the positive factors of 8 and set N contains only the positive factors of 16, then the union of sets M and N :

- A. contains exactly the same elements that are in set N .
- B. contains only the elements that are in both sets M and N .
- C. contains nine elements.
- D. contains four elements.
- E. contains only even elements.

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Set M contains the positive factors of 8: 1, 2, 4, and 8. Set N contains the positive factors of 16: 1, 2, 4, 8, and 16. The union of these sets is equal to all of the elements that are in either set. Since every element in set M is in set N , the union of N and M is the same as set N : {1, 2, 4, 8, 16}.

QUESTION 162 A 12-piece chicken meal is ordered at a local KFC, but the family ordering has decided it will give the four chicken breasts included to a homeless person. What are the chances one of the remaining pieces is a drumstick?

- A. $\frac{1}{8}$
- B. $\frac{1}{10}$ C. $\frac{1}{12}$
- D. $\frac{1}{16}$

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:
Answer A is correct. You know four of the 12 are breasts. Removing these leaves you with eight pieces remaining. Assuming wings, thighs, and drumsticks are included, there is a one in eight chance for the remainder.

QUESTION 163

What is the degree measure of the acute angle formed by the hands of a 12-hour clock that reads exactly 1 o'clock?

- A. 15°
- B. 30°
- C. 45°
- D. 60°
- E. 72°

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:

Explanation:
One complete rotation of a clock hand is 360° , and there are 12 hourly markings on a clock. When the hands read exactly 1 o'clock, the degree measure of the angle formed by the clock hands is $\frac{1}{12}$ of a complete rotation, or $\frac{1}{12} \times 360^\circ = 30^\circ$.

QUESTION 164

What is the probability that a number selected at random from the set {2, 3, 7, 12, 15, 22, 72, 108} will be divisible by both 2 and 3?

- A. $\frac{1}{4}$
- B. $\frac{3}{8}$
- C. $\frac{3}{5}$
- D. $\frac{5}{8}$
- E. $\frac{7}{8}$

Correct Answer: B

Section: (none) Explanation

B.....	2
C.....	3
D.....	3
E.....	3
Correct Answer:	3

Explanation/Reference:

Explanation:
The correct response is B. Since 12, 72, and 108 are the only numbers in the list divisible by both 2 and 3, the probability that the number selected at random is divisible by both 2 and 3 is $\frac{3}{8}$.

QUESTION 165 A circle has a circumference of 16π feet. What is the radius of the circle, in feet?

- A. $\sqrt{8}$

Section: (none)

Explanation

Explanation/Reference:

Explanation:

8 is the correct answer. The formula for the circumference of a circle with radius r is $2\pi r$. So $2\pi r = 16$, or $r = 8$.

QUESTION 166

A rectangle with a perimeter of 30 centimeters is twice as long as it is wide. What is the area of the rectangle in square centimeters?

A. 15

B. 50

C. 200

$3\sqrt{15}$

$6\sqrt{15}$

D.

E.

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If w = width, then $2w$ = length. So, the perimeter is $2 \times (w + 2w) = 30$, and $w = 5$. Since the width is 5, the length is $2 \times 5 = 10$. Then the area is $5 \times 10 = 50$.

QUESTION 167

In the standard (x, y) coordinate plane, what are the coordinates of the midpoint of a line segment whose endpoints are $(-3, 0)$ and $(7, 4)$?

A. (2, 2) B.

(2, 4)

C. (5, 2) D.

(5, 4)

E. (5, 5)

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

(2, 2) is the correct answer. To find the midpoint, you need to take the average of each of the coordinates, $((-3 + 7) / 2, (0 + 4) / 2) = (2, 2)$

QUESTION 168

Points A, B, C, and D are on a line such that B is between A and C, and C is between B and D. The distance from A to B is 6 units. The distance from B to C is twice the distance from A to B, and the distance from C to D is twice the distance from B to C. What is the distance, in units, from the midpoint of \overline{BC} to the midpoint of \overline{CD} ?

A. 18 B.

14

C. 12

D. 9E. 6

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

$BC = 2 \times AB = 2 \times 6 = 12$ and $CD = 2 \times BC = 2 \times 12 = 24$. The distance between the midpoints of \overline{BC} and \overline{CD} is $\frac{1}{2} \times BC + \frac{1}{2} \times CD = \frac{1}{2} \times 12 + \frac{1}{2} \times 24 = 18$.

QUESTION 169

Which of the following statements *must* be true whenever n , a , b , and c are positive integers such that $n < a$, $c > a$, and $b > c$?

- A. $a < n$
- B. $b - n > a - n$
- C. $b < n$
- D. $n + b = a + c$
- E. $2n > a + b$

Correct Answer: B

Section: (none)

Explanation

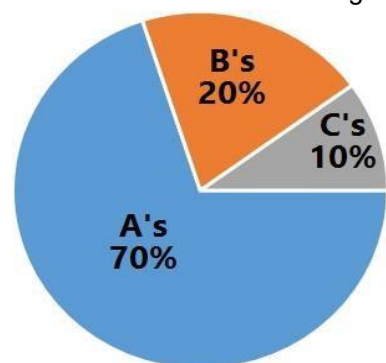
Explanation/Reference:

Explanation:

The correct response is B. Since $b > a$, subtracting n from each side, $b - n > a - n$, will not change the relationship between b and a .

QUESTION 170

The distribution of Jamal's high school grades by percentage of course credits is given in the circle graph below. What is Jamal's grade point average if each A is worth 4 points; each B, 3 points; and each C, 2 points?



- A. 3.0
- B. 3.4
- C. 3.6
- D. 3.7
- E. Cannot be determined from the given information.

Correct Answer: C

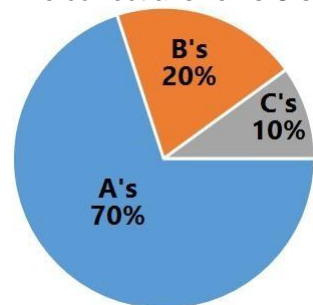
Section: (none)

Explanation

Explanation/Reference:

Explanation:

The correct answer is C since $4 \times 0.7 + 3 \times 0.2 + 2 \times 0.1 = 3.6$.



QUESTION 171

What is the difference between 1.8 and $1.\overline{08}$?

(Note: A bar indicates a digit pattern that is repeated.) A.

$$0.\overline{71}$$

$$0.\overline{71}$$

$$0.7\overline{19}$$

$$0.7\overline{2}$$

$$0.\overline{72}$$

B.

C.

D. E.

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Take $1.\overline{08}$ and repeat the pattern several times, then subtract that from 1.8.

$$1.8 - 1.08080808 \approx 0.7191919.$$

Realizing that the pattern should repeat, you can conclude that choice C is the correct answer.

QUESTION 172

Which of the following equations represent the linear relationship between time, t , and velocity, v , shown in the table below?

t	0	1	2
v	120	152	184

A. $v = 32t$

B. $v = 32t + 120$ C. $v = 120t$

D. $v = 120t + 32$

E. $v = 120t + 120$

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

A linear relationship means the associated graph is a line. So, you can think of the ordered pairs (t, v) as points on the line. Since $(0, 120)$, $(1, 152)$, and $(2, 184)$ are points on the line, the slope of the line is $(152 - 120) / (1 - 0) = 32$. Therefore, $v = 32t + b$, where b is the y -intercept of the line. Since $(0, 120)$ is a point on the line, $120 = 32 \times 0 + b$, or $b = 120$. Thus, an equation for the line is $v = 32t + 120$.

QUESTION 173

An industrial cleaner is manufactured using only the 3 secret ingredients A, B, and C, which are mixed in the ratio of 2:3:5, respectively, by weight. How many pounds of secret ingredient B are in a 42-pound (net weight) bucket of this cleaner?

A. 4.2

- B. 12.6
- C. 14.0
- D. 18.0
- E. 21.0

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

If you let $3x$ be amount of secret ingredient B , you can set up the equation $2x + 3x + 5x = 42$. Since $10x = 42$, $x = 4.2$, and $B = 3x = 12.6$.

QUESTION 174

If $n = 8$ and $16 \times 2^m = 4n^{-8}$, then $m = \underline{\hspace{1cm}}$.

- A. -4
- B. -2
- C. 0D. 1 E. 8

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

When $n = 8$, $4n^{-8} = 4^{8-8} = 4^0 = 1$, and $16 \times 2^m = 2^4 \times 2^m = 2^{4+m}$. So, $2^{4+m} = 1$, and any number to the zeroth power is 1, so $4 + m = 0$, or $m = -4$.

QUESTION 175 Which of the following has a vertex of $(4, -4)$?

- A. $y = 5(x - 4)^2 - 4$
- B. $y = 5(x + 4)^2 - 4$ C. $y = 5(x - 4)^2 + 4$
- D. $y = 5(x + 4)^2 + 4$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer A is correct. Plug in (x, y) and solve for equations to determine the answer.

QUESTION 176

A banquet hall charges a base price of x dollars for one hour of rental time. A sales tax of a certain percentage is applied to the base price, and an untaxed deposit is added. If the total amount is paid at the time of the purchase for one night is given by the expression $1.085x + 18$, then what is the sales tax, expressed as a percentage of the base price?

- A. 0.085%
- B. 1.085%
- C. 8.5%
- D. 18%

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. x is what it costs for one hour of rental time in dollars, so it must be multiplied by the hours rented and the sales tax rate to get an accurate depiction of cost per unit of time (hour – 1.085 is 1 hour + .085 sales tax rate, hence the sales tax, when multiplied by 100 for percent conversion, is 8.5%).

QUESTION 177 What is the equation of a line that contains the point (2, 10) and has a y-intercept of 6?

- A. $y = 1/2x + 6$
- B. $y = x + 6$
- C. $y = 2x + 6$
- D. $y = 4x + 6$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Solving for equations yields only one with correct plug-in computations and y-intercept in appropriate place.

QUESTION 178

John took out a cash advance of x dollars from a financing company. The company deducts a fee of $1/4$ of the original advanced amount along with a transfer fee of \$25.

Which of the following represents the final advanced amount that John receives after all applied fees in dollars?

- A. $1/4x - 25$
- B. $1/4 \times (x - 25)$
- C. $3/4 \times (x - 25)$
- D. $3/4x - 25$

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. John would be left with three-quarters the amount upon removing the one-fourth.

QUESTION 179

The number of bonus points, $B(p)$, a credit card holder receives is given by the function $B(p) = 4p + 2$, where p represents the number of purchases made. If the number of purchases is increased by 8, by how much does the number of bonus points increase?

- A. 4
- B. 8
- C. 32
- D. 64

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Plug in numbers following the guidelines, first before the increase and then after, and subtract the two.

QUESTION 180

$$\frac{3x^2 - 2x - 6}{x^2 - 4x + 17} = \frac{x^2 + 7x + 10}{x^2 + 2x + 3}$$

- A. 1
- B. 2
- C. 3
- D. 4

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Plug in numbers. 4 is the only one that gives you an equality ($34 \div 54 = 17 \div 27 > 17 \div 27 = 17 \div 27$).

QUESTION 181 If $x^2 + 13x = 90$ and $x > 0$, what is the value of x ?

- A. -5
- B. 0C. 5
- D. 10

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Solve for x , then plug in the answer choices to check your work.

QUESTION 182

If x is more than one-third the value of y , which of the following expresses the value of y in terms of x ?

- A. $y = (x + 2) / 3$
- B. $y = (x - 2) / 3$
- C. $y = 3 \times (x - 2)$
- D. $y = 3 \times (x - 6)$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Always try plugging in when presented with variables in questions and answers. Keep numbers simple. Choosing 12 for Answer C, write $b = 2 + 1/3 \times 12$. Solving leaves you with $b = 2 + 4 = 6$. Plug in 6 to each equation to see what works.

QUESTION 183 Which of the following is equivalent to $(2x + 6) / 4$ times $(6x - 36) / (3x + 9)$?

- A. $(12x^2 - 216) / (12x + 36)$
- B. $(8x - 30) / (3x + 13)$
- C. $(x - 6) / 4$
- D. $x - 6$

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Pick a small, simple number and solve for each number.

QUESTION 184 If $x^2 + 16x = 161$, and $x > 0$, what is the value of x ?

- A. 3
- B. 7
- C. 11
- D. 15

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Simply plug in numbers and solve.

QUESTION 185

The population (x) of town (y) since 2000 can be estimated by the equation $x = 1.0635z + 3,250$, where z is the number of years since 2000 and $0 \leq z \leq 20$. In the context of this equation, what does the number 1.0635 most likely represent?

- A. The estimated population of town (y) in 2000.
- B. The estimated population of town (y) in 2017.
- C. The factor by which the population of town (y) has grown annually.
- D. The factor by which the population of town (y) has decreased annually.

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. No negative numbers so there is an increase, not decrease underway. The decimal sets off growth, too, so the equation can qualify as neither Answer A or B as well.

QUESTION 186 In the following equation, what is the value of x ?

$$\frac{1}{2}x + 4 = \frac{3}{4}x - 5$$

- A. 8
- B. 9
- C. 27
- D. 36

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Plug in the answer options and find the one that solves the equations.

QUESTION 187 Which of the following is equivalent to $(12x^2 + 4x + 5y) + (3x^2 - 2x + 3y) = 15x^2 + 2x + 8y$?

- A. $17x^2 + 4x + 8y$
- B. $17x^2 + 4x - 8y$
- C. $17x^2 - 4x + 8y$
- D. $8y - 4x + 17x^2$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer A is correct. Add all like variables.

QUESTION 188

A car averages 30 miles per gallon. If gas costs \$2.20 per gallon, which of the following is closest to how much the gas would cost for this car to travel 3,250 miles?

- A. \$48.73
- B. \$111.23C. \$238.33
- D. \$372.14

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. At 30 miles per gallon, it takes 108.33 gallons \times \$2.20 to make the whole trip. This equals \$238.33.

QUESTION 189 When $x = 4$ and $y = 6$, by how much does the value of $3x^2 - 3y$ exceed the value of $2x^2 - 2y$?

- A. 5
- B. 10C. 15
- D. 20



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Plug numbers into two equations. Solve. Subtract the lower number from the higher number.

QUESTION 190 What is the value of x when

$$2x + 7 = 3x - 5?$$

- A. 2
- B. 6
- C. 12
- D. 24

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Add $-2x$ to both sides of the equality. This leaves $7 = x - 5$. Add 5 to both sides to isolate the variable. You're left with $12 = x$.

QUESTION 191 What is the greatest common factor of 52, 156, and 260?

- A. 4

- B. 18C. 36
D. 52

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Start with the largest number to save on time. Divide it into each to see if you get a whole number. The first that is, is your answer.

QUESTION 192 Sales for a business were \$4 million more the second year than the first, and sales for the third year were double sales of year two. If sales of the third year were \$48 million, what were sales in millions of dollars for the first year?

- A. 10 B.
15
C. 20 D.
25

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Divide year three by two to get year two total. Subtract four from that to get the year one total. Answer should be 20.

QUESTION 193 If $x \times y = 156$, $x + y = 43$, and $x < y$, what is the value of $x - y$?

- A. -35
B. 35
C. 0
D. -24



Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer A is correct. Divide 156 by two and check to see if two numbers add up to 43. $156 \div 2 = 78$. $2 + 78 = 43$? Try again. $156 \div 3 = 3 + 52 = 55$? Try again. $156 \div 4 = 39$. $4 + 39 = 43$? Correct. Now plug in the lower number for x (4) and the higher number for y (39), and you're left with $4 - 39$, or $4 + (-39)$. This equals -35.

QUESTION 194 A building built on a level field casts a shadow seven feet long and stands 35 feet tall. A nearby building casts a shadow 14 feet long. How tall is the building?

- A. 28
B. 42
C. 56
D. 70

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer D is correct. The shadow is one-fifth of the building height on building one. Since they are both on a level field, you can expect the same ratio ($14 \times 5 = 70$).

QUESTION 195 Membership fees for NetFilms streaming service include a one-time membership fee of \$10 and ongoing monthly fees of \$5. How many months would you be able to buy with \$120 after the membership fee is removed?

- A. 22
- B. 23
- C. 24
- D. 25

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer A is correct. The one-time fee reduces the \$120 to \$110. Since it is one-time and not recurring, that will be the only time it has to be assessed. From there, divide \$110 by the \$5 per month ongoing price to get 22 months.

QUESTION 196 If $y = -6$, what is the value of $(y^3 - 40) / (y - 2)$?

- A. -32
- B. 32
- C. 0
- D. 64

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Plug in -6 to each use of y . That will leave you with $(-216 - 40) / (-6 - 2)$, or $-256 / -8$. Divide -256 by -8 . The negatives will cancel out leaving you with 32.

QUESTION 197 What is the perimeter, in feet, of a rectangle with width 10 feet and length 20 feet?

- A. 30 B. 60
- C. 90
- D. 120

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Rectangles have two pair of equal sides, so double the two values given and add them together.

QUESTION 198

A company offers early bird pricing of \$15 on a new product if there are 10 or fewer orders. The price goes down to \$12.50 if it is ordered by more than 10. Twenty ends up ordering at the \$15 amount. How much does the company end up offering as rebate?

- A. \$25 B. \$50
- C. \$75
- D. \$100

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Twenty times \$15 equals \$300. Since the 10-person threshold is met, the price goes down \$2.50 for each order ($\$2.50 \times 20 = \50).

QUESTION 199 For what value of x is the equation $8/x = 6/12$?

- A. 8
- B. 12
- C. 16
- D. 24

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Cross-multiply and you end up with $(8 \times 12) = (6 \times x)$, or $6x = 96$. Divide 96 by six, and $x = 16$.

QUESTION 200 If $f(x) = 8x^2 - 10x + 5$, then $f(-4) = ?$

- A. -173
- B. -3
- C. 50
- D. 173

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Substitute (-4) for x and solve.

QUESTION 201 If $2(x - 14) = 22$, then $x = \underline{\hspace{1cm}}$.

- A. 20
- B. 25
- C. 30
- D. 35

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Get rid of the parentheses by multiplying 2 times x and -14 . This leaves you with $2x - 28 = 22$. Isolate the variable by adding 28 to both sides, leaving $2x = 50$. Divide both sides by 2 ($x = 25$).

QUESTION 202 Which number is a common multiple of 35, 5, and 50?



- A. 100
- B. 180
- C. 250
- D. 350

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Start with the largest number (350) to help narrow your options. Fifty (50) will go into 350 seven times. Thirty-five (35), 10 times. Five (5), 70 times.

QUESTION 203

The expression $9 \times (x - 3) + 2 \times (4x + 4)$ is equivalent to:

- A. $(x - 19) / 17$
- B. $x - 19$
- C. $17x - 19$
- D. $x - 17$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Multiply to get rid of the parentheses. You get $9x - 27 + 8x + 8$. Simplify by adding like units. $9x + 8x$ is $17x$ and $-27 + 8$ is -19 . This leaves you with $17x - 19$.

QUESTION 204 If $a + 3b = 37$ and $a - 3b = 19$, then $b = \underline{\hspace{1cm}}$.

- A. 3
- B. 6
- C. 12
- D. 24

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer A is correct. Using system of equations, add the two givens like such:

$$a + 3b = 37$$

$$\underline{a - 3b = 19}$$

$$2a = 56$$

$$a = 28$$

Now plug in 28 and isolate b .

$$28 + 3b = 37$$

$$3b = 9$$

$$b = 3$$

AND

$$\begin{aligned}28 - 3b &= 19 \\ -3b &= -9 \\ b &= 3\end{aligned}$$

QUESTION 205

A book receives 30 reviews on Amazon as judged by a 5-star scale. Sixty percent gave the book 5 out of 5 Stars. How many reviewers gave it this rating?

- A. 6
- B. 12
- C. 18
- D. 24

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. There are thirty reviews. Multiply this by the decimal form of 60% (0.60). Eighteen (18) will be your answer.

QUESTION 206

What is the degree measure of the obtuse angle formed by the hands of a 12-hour clock that reads exactly one o'clock?

- A. 165°
- B. 150°
- C. 135°
- D. 120°

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. A 12-hour clock forms a circle (360°). Half the clock is 180° . Divide 360 by 12 and get 30, as in the acute angle of one o'clock is 30° . That leaves the obtuse angle as 150° .

QUESTION 207

A rectangle with a perimeter of 30 centimeters is twice as long as it is wide. What is the area of the rectangle in square centimeters?

- A. 20
- B. 30
- C. 40
- D. 50

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Perimeter is determined by adding the four sides. Since rectangles will always consist of two pair of equal sides, the two long sides added to the two short sides must equal 30. We also know that one pair will be twice as long as the other pair. ($2x + 2y = 30$, or $x + y = 15$). Now think multiples of 15. Five (5) comes immediately to mind. Sub it for one of the variables. $5 + y = 15$, or $y = 10$. Is 10 twice as long as 5 and do the two equal 15? Yes, they do. Now that you have your side measurements, multiply them to get the area in square centimeters. Fifty (50) is your answer.

QUESTION 208 If $x \times y = 144$, $x + y = 30$, and $x > y$, what is the value of x/y ?

- A. 4
- B. 8

- C. 16
- D. 32

Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer A is correct. Start with multiples of 144. Look for numbers that, when added together, equal 30. The larger will be x. In this case, 24 is x, 6 is y, and 24 divided by 6 is four.

QUESTION 209

What is x, the second term in the series of $\frac{1}{3} + x + \frac{1}{27} + \frac{1}{81} \dots$?

- A. $\frac{1}{6}$
- B. $\frac{1}{9}$
- C. $\frac{1}{12}$
- D. $\frac{1}{15}$

Correct Answer: B
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer B is correct. You will notice a pattern where each new number is created by multiplying the previous by $\frac{1}{3}$.

QUESTION 210 A streaming box with a list price of \$120 is marked down 30%. If Steve gets an employee discount of 20% off the sale price, how much does he pay for the device?

- A. \$67.20
- B. \$72.30
- C. \$78.40
- D. \$80.00



Correct Answer: A
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer A is correct. First, you must determine the sale price by multiplying \$120 times the decimal form of 70% (0.70) to account for the 30% discount. This leaves you with \$84.00. Steve will get a 20% discount on that, so you will want to multiply times the decimal form of 80% (0.80). The answer is \$67.20.

QUESTION 211 A car departs Little Rock, Ark., traveling to a baseball game located nine miles east and 12 miles north of the departure point. About how many miles is the game from the departure point?

- A. 3
- B. 63
- C. 15
- D. 21

Correct Answer: C
Section: (none)
Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Use the Pythagorean theorem since the directions as given form a right triangle. $9^2 + 12^2 = c^2$, or $81 + 144 = 225^2$. Take the square root, and you're left with 15.

QUESTION 212 A youth basketball program serves a total of 280 children who are either 11 or 12 years old. The sum of the children's ages equal 3,238 years. How many 12-year-old children are in the program?

- A. 55
- B. 122
- C. 132
- D. 158

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. Finding answer requires a series of operations.

Firstly, choose one of the answers provided and use it to determine the sum of the 11-year-old ages. Start here because it is easier to operate with existing numbers than to simply make up figures.

122×11 can be discovered by adding a zero to the end of 122 (1,220), then adding 122 to that for a total of 1,342. Subtract 1,342 from the sum of 3,238, and you'll get 1,896. Now divide 1,896 by 12 to get 158. Further, the sum of 158 and 122 equals 280, so the answer checks out on that end as well.

QUESTION 213 What is the probability that a number selected at random from the set {2, 4, 5, 7, 9, 10, 12, 13, 18, 20, 60, 124} will be divisible by both 2 and 5?

- A. $1/12$
- B. $2/12$
- C. $1/4$
- D. $3/4$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Only four of the 12 numbers in the set are divisible by five, but one of those – 5 – is not divisible by 2. So only three of 12 numbers qualify, or $1/4$.

QUESTION 214 A dish is cooked with the secret ingredients A, B, and C mixed in the ratio 2:3:5, respectively, by weight. How many pounds of secret ingredient A are in 42 pounds of the dish?

- A. 8.4
- B. 12.6
- C. 21
- D. 42

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer A is correct. $2:3:5=42$, or $2x + 3x + 5x = 42$, $10x = 42$, $x = 4.2$. Now sub 4.2 in for x. Ingredient A is 2 in the ratio, so $2(4.2) = 8.4$.

QUESTION 215

If $n = 8$, what is $4n^{-8}$?

- A. 0
- B. 1
- C. 2
- D. 3

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Any number (N) to the zero power (N^0) equals one.

QUESTION 216

When $x = 4$ and $y = 5$, by how much does the value of $3x^2 - 2y$ exceed the value of $2x^2 - 3y$?

- A. 3
- B. 7
- C. 21
- D. 28

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer C is correct. Just plug the numbers in to both equations. Subtract the lower value from the higher.

QUESTION 217

A meter is a measure of length, and 10 decimeters is equal in length to one meter. How many decimeters are equal in length to 14.5 meters?

- A. 1,450
- B. 145
- C. 14.5
- D. 1.45



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer B is correct. Multiply 14.5 times 10 to get the answer.

QUESTION 218 Which of the following is true?

- A. Zero is the smallest prime number.
- B. Zero is a negative number.
- C. The largest factor of 42 is 14.
- D. The sum of a positive number and its correlating negative is always zero.

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. $-1 + 1 = 0$, $-42 + 42 = 0$, etc. As for the others, zero is neither positive or negative and is not a prime number. Furthermore, 14 is not the largest number that will go into 42. That would be 42 itself.

QUESTION 219 If $3x - 1 = 11$, what is the value of $3x + 1$?

- A. 10
- B. 11
- C. 12
- D. 13

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer D is correct. First, solve for $3x - 1 = 11$ by adding 1 to each side, $3x = 12$. Divide both sides by 3 to isolate the variable, and you get $x = 4$. Now plug in four to the other equation. $3 \times 4 + 1 = 13$.

QUESTION 220 Which of the following represents four times the sum of x and 8?

- A. $4 \times (x + 8)$
- B. $4x + 8$
- C. $x + 8$
- D. $4x$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

Explanation:

Answer A is correct. Four (4) is a number that would have to be multiplied by x and 8.

QUESTION 221

Marcus's favorite casserole recipe requires 3 eggs and makes 6 servings. Marcus will modify the recipe by using 5 eggs and increasing all other ingredients in the recipe proportionally.

What is the total number of servings the modified recipe will make?

- A. 6
- B. 8
- C. 10
- D. 12
- E. 15

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 222

The 35-member History Club is meeting to choose a student government representative. The members decide that the representative, who will be chosen at random, **CANNOT** be any of the 3 officers of the club.

What is the probability that Hiroko, who is a member of the club but **NOT** an officer, will be chosen?

- A. 0
- B. $\frac{4}{35}$
- C. $\frac{1}{35}$
- D. $\frac{1}{3}$
- E. $\frac{1}{32}$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

QUESTION 223

For what value of x is the equation $2^2x^{+7} = 2^{15}$ true?

- A. 2
- B. 4
- C. 11D. 16
- E. 44

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 224 Let the function f be defined as $f(x) = 5x^2 - 7(4x + 3)$. What is the value of $f(3)$?

- A. -18
- B. -26
- C. -33
- D. -60
- E. -75

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 225

A wallet containing 5 five-dollar bills, 7 ten-dollar bills, and 8 twenty-dollar bills is found and returned to its owner. The wallet's owner will reward the finder with 1 bill drawn randomly from the wallet. What is the probability that the bill drawn will be a twenty-dollar bill?

- A. 1/20
- B. 4/51
- C. 1/8D. 2/5
- E. 2/3

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 226

The ABC Book Club charges a \$40 monthly fee, plus \$2 per book read in that month. The Easy Book Club charges a \$35 monthly fee, plus \$3 per book read in that month. For each club, how many books must be read in 1 month for the total charges from each club to be equal?

- A. 1
- B. 4

- C. 5
- D. 6
- E. 75

Correct Answer: C

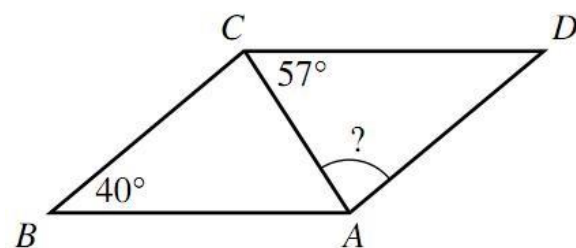
Section: (none)

Explanation

Explanation/Reference:

QUESTION 227

In parallelogram ABCD below, \overline{AC} is a diagonal, the measure of $\angle ABC$ is 40° , and the measure of $\angle ACD$ is 57° .



What is the measure of $\angle CAD$?

- A. 40°
- B. 57°
- C. 77°
- D. 83°
- E. 97°



Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 228 When $x = 1/2$, what is the value of $(8x - 3) / x$?

- A. $1/2$
- B. 2
- C. $5/2$
- D. 5
- E. 10

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 229 In the standard (x, y) coordinate plane, what is the midpoint of the line segment that has endpoints $(3, 8)$ and $(1, -4)$?

- A. $(-2, -12)$

- B. $(-1, -6)$
- C. $(11/2, -3/2)$
- D. $(2, 2)$
- E. $(4, -12)$

Correct Answer: D

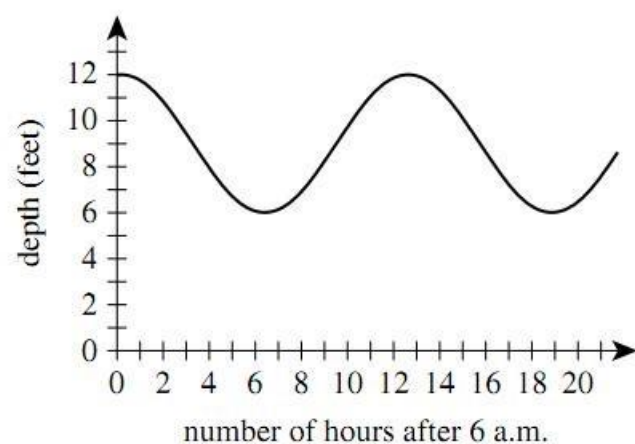
Section: (none)

Explanation

Explanation/Reference:

QUESTION 230

The fluctuation of water depth at a pier is shown in the figure below. One of the following values gives the positive difference, in feet, between the greatest water depth and the least water depth shown in this graph. Which value is it?



- A. 3
- B. 6
- C. 9
- D. 12
- E. 19



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 231 What is the slope of the line through $(-2, 1)$ and $(2, -5)$ in the standard (x, y) coordinate plane?

- A. $3/2$
- B. 1
- C. -1
- D. $-3/2$
- E. -4

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 232

In Cherokee County, the fine for speeding is \$17 for each mile per hour the driver is traveling over the posted speed limit. In Cherokee County, Kirk was fined \$221 for speeding on a road with a posted speed limit of 30 mph. Kirk was fined for traveling at what speed, in miles per hour?

- A. 13
- B. 17
- C. 43
- D. 47
- E. 60

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 233 What is the sum of the solutions of the 2 equations below?

$$8x = 12$$

$$10 = 22 + \frac{2}{5}y$$

$$2\frac{2}{5}$$

$$7\frac{1}{2}$$

B.

C. 9 D.

10

$$17\frac{1}{2}$$

E.



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 234 The average of 5 distinct scores has the same value as the median of the 5 scores. The sum of the 5 scores is 420. What is the sum of the 4 scores that are **NOT** the median?

- A. 315
- B. 320
- C. 336
- D. 350
- E. 360

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 235

What is the value of the expression below?

$$| -8 + 4 | - | 3 - 9 |$$

- A. -18
- B. -2
- C. 0
- D. 2
- E. 18

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 236 Which of the following expressions is

equivalent to $x^{2/3}$? A.

$$\frac{x^2}{3}$$

$$\frac{x \times 2}{3}$$

$$\sqrt{x^3}$$

$$\sqrt[3]{x}$$

$$\sqrt[3]{x^2}$$

B.

C.

D. E.



Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

QUESTION 237 In the standard (x, y) coordinate plane, what is the slope of the line given by the equation

$$4x = 7y + 5?$$

- A. $-4/7$
- B. $4/7$
- C. $7/4$
- D. 4E. 7

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 238 For which of the following conditions will the sum of integers m and n *always* be an odd integer?

- A. m is an odd integer.
- B. n is an odd integer.

- C. m and n are both odd integers.
- D. m and n are both even integers.
- E. m is an odd integer and n is an even integer.

Correct Answer: E

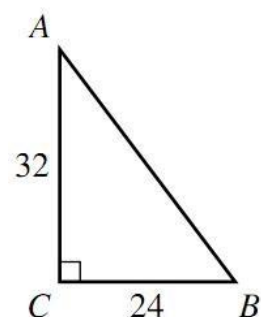
Section: (none)

Explanation

Explanation/Reference:

QUESTION 239

The lengths of the 2 legs of right triangle ABC shown below are given in inches. The midpoint of \overline{AB} is how many inches from A?



- A. 16
- B. 20
- C. 21
- D. 28
- E. 40



Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 240

In triangle DEF, the length of \overline{DE} is $\sqrt{30}$ inches, and the length of \overline{EF} is 3 inches. If it can be determined, what is the length, in inches, of \overline{DF} ?

- A. 3
- $\sqrt{30}$
- $\sqrt{33}$
- $\sqrt{39}$
- B.
- C.
- D.
- E. Cannot be determined from the given information.

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

QUESTION 241

Laura plans to paint the 8-foot-high rectangular walls of her room, and before she buys paint she needs to know the area of the wall surface to be painted. Two walls are 10 feet wide, and the other 2 walls are 15 feet wide. The combined area of the 1 window and the 1 door in her room is 60 square feet. What is the area, in square feet, of the wall surface Laura plans to paint?

- A. 200
- B. 340
- C. 360
- D. 390
- E. 400

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 242 The length of a rectangle is 5 inches longer than the width. The perimeter of the rectangle is 40 inches. What is the width of the rectangle, in inches?

- A. 7.5
- B. 8
- C. 15
- D. 16
- E. 17.5

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:



QUESTION 243 8% of 60 is $\frac{1}{5}$ of what number?

- A. 0.96
- B. 12
- C. 24
- D. 240
- E. 3,750

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 244

Armin is trying to decide whether to buy a season pass to his college basketball team's 20 home games this season. The cost of an individual ticket is \$14, and the cost of a season pass is \$175. The season pass will admit Armin to any home basketball game at no additional cost.

What is the minimum number of home basketball games Armin must attend this season in order for the cost of a season pass to be less than the total cost of buying an individual ticket for each game he attends?

- A. 8
- B. 9
- C. 12D. 13

E. 20

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 245

$(4.8 \times 10^{-7}) / (1.6 \times 10^{-11})$

- A. 3.0×10^4
- B. 3.0×10^{-4}
- C. 3.0×10^{-18}
- D. 3.2×10^{18}
- E. 3.2×10^4

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 246

A circle in the standard (x, y) coordinate plane has center $C(-1, 2)$ and passes through $A(2, 6)$. Line segment \overline{AB} is a diameter of this circle. What are the coordinates of point B?

- A. $(-6, -2)$ B. $(-5, -1)$
- C. $(-4, -2)$
- D. $(4, 2)$
- E. $(5, 10)$

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 247 Which of the following expressions is a factor of $x^3 - 64$?

- A. $x - 4$
- B. $x + 4$
- C. $x + 64$
- D. $x^2 + 16$
- E. $x^2 - 4x + 16$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 248 The average of a list of 4 numbers is 90.0. A new list of 4 numbers has the same first 3 numbers as the original list, but the fourth number in the original list is 80, and the fourth number in the new list is 96.

What is the average of this new list of numbers?

- A. 90.0
- B. 91.5
- C. 94.0
- D. 94.5
- E. 94.8

Correct Answer: C

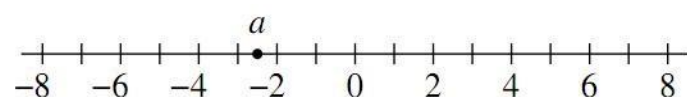
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Explanation

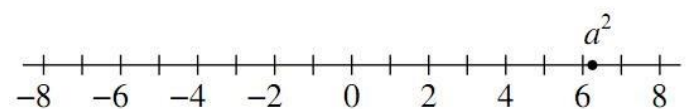
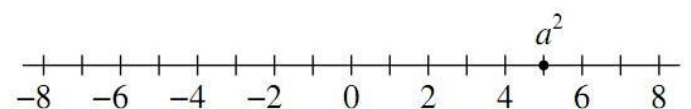
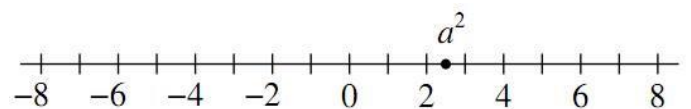
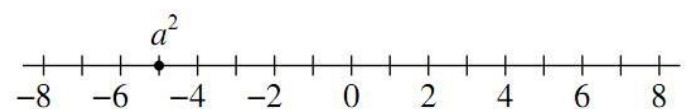
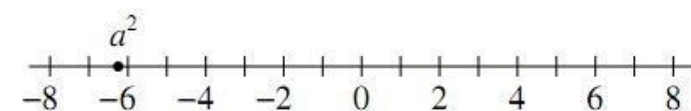
Explanation/Reference:

QUESTION 249

The number a is located at -2.5 on the number line below



One of the following number lines shows the location of a^2 . Which number line is it? A.



B.

C.

D.

E.

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:

QUESTION 250 Maria ordered a pizza. She ate only $\frac{2}{9}$ of it and gave the remaining pizza to her 3 brothers. What fraction of the whole pizza will each of Maria's brothers receive, if they share the remaining pizza equally?

- A. $\frac{7}{9}$
- B. $\frac{3}{7}$ C. $\frac{1}{3}$
- D. $\frac{7}{27}$
- E. $\frac{2}{27}$

Correct Answer: D
Section: (none)
Explanation

Explanation/Reference:

QUESTION 251

The number 1,001 is the product of the prime numbers 7, 11, and 13. Knowing this, what is the prime factorization of 30,030?

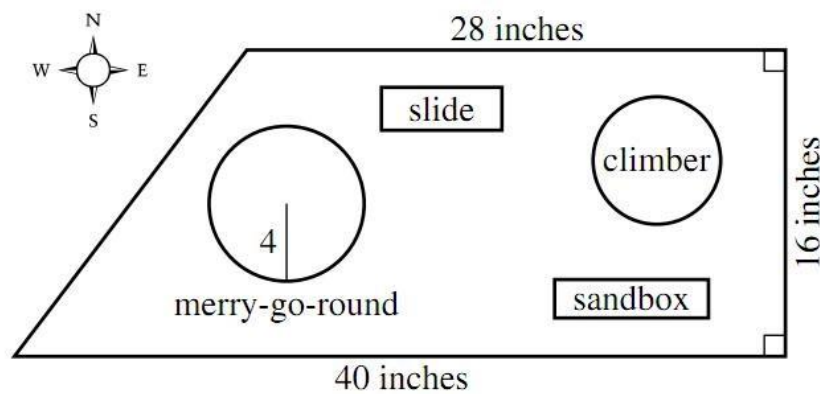
- A. $3 \cdot 7 \cdot 10 \cdot 13$
- B. $30 \cdot 7 \cdot 11 \cdot 13$
- C. $2 \cdot 5 \cdot 7 \cdot 11 \cdot 13$
- D. $3 \cdot 7 \cdot 10 \cdot 11 \cdot 13$
- E. $2 \cdot 3 \cdot 5 \cdot 7 \cdot 11 \cdot 13$

Correct Answer: E
Section: (none)
Explanation

Explanation/Reference:

QUESTION 252

Mikea, an intern with the Parks and Recreation Department, is developing a proposal for the new a trapezoidal Springdale Park. The figure below shows her scale drawing of the proposed park with 3 side lengths and radius of the merry-go-round given in inches. In Mikea's scale drawing, 1 inch represents 1.5 feet.



What is the area, in square inches, of the scale drawing of the park?

- A. 448
- B. 544
- C. 640
- D. 672
- E. 1,088

Correct Answer: B

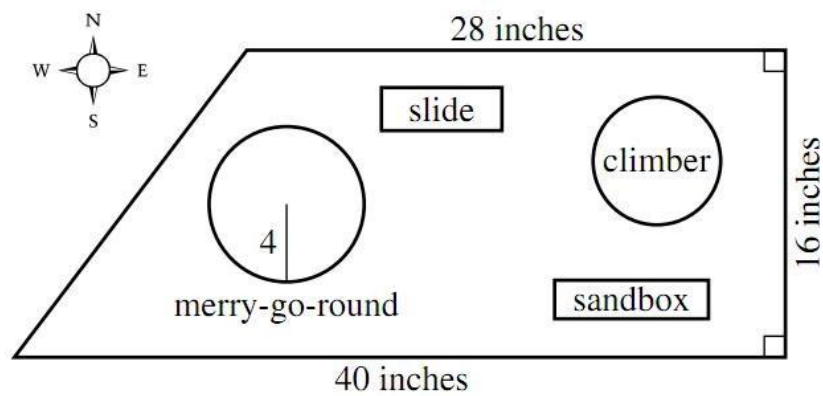
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Explanation

Explanation/Reference:

QUESTION 253

Mikea, an intern with the Parks and Recreation Department, is developing a proposal for the new a trapezoidal Springdale Park. The figure below shows her scale drawing of the proposed park with 3 side lengths and radius of the merry-goround given in inches. In Mikea's scale drawing, 1 inch represents 1.5 feet.



Mikea's proposal includes installing a fence on the perimeter of the park. What is the perimeter, in *feet*, of the park?

- A. 84
- B. 88
- C. 104
- D. 126
- E. 156

Correct Answer: E

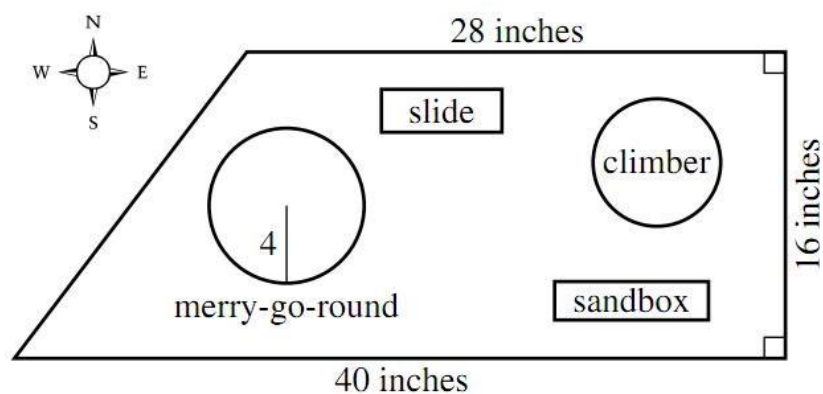
Section: (none)

Explanation

Explanation/Reference:

QUESTION 254

Mikea, an intern with the Parks and Recreation Department, is developing a proposal for the new a trapezoidal Springdale Park. The figure below shows her scale drawing of the proposed park with 3 side lengths and radius of the merry-goround given in inches. In Mikea's scale drawing, 1 inch represents 1.5 feet.



The length of the south side of the park is what percent of the length of the north side?

- A. 112%
- B. 124%
- C. $142\frac{6}{7}\%$
- D. 175%
- E. 250%

Correct Answer: C

Section: (none)

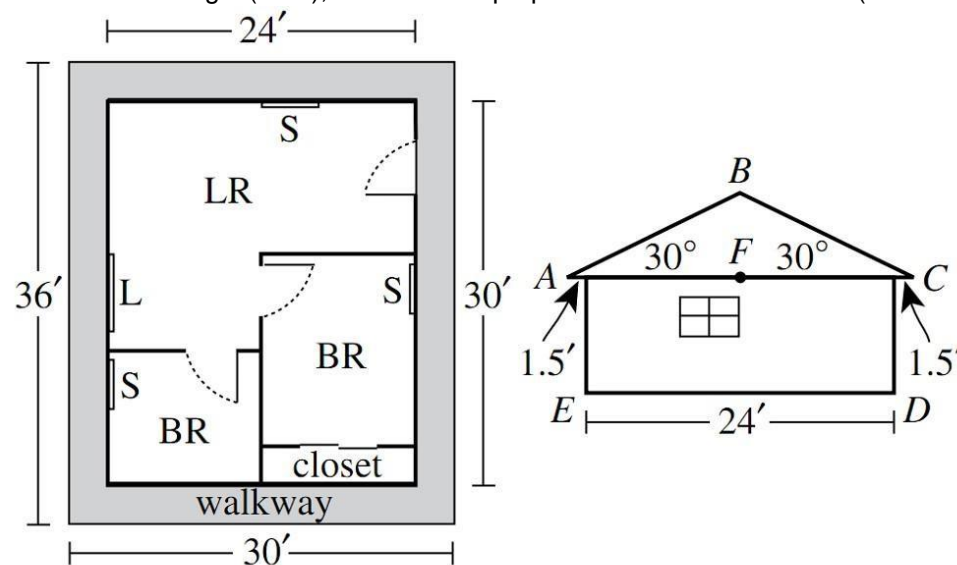
Explanation

Explanation/Reference:



QUESTION 255

The Smith family is planning to build a 3-room cabin which consists of 2 bedrooms (BR) and 1 living room (LR). Shown below are the rectangular floor plan (left figure) and a side view of the cabin (right figure). In the side view, the roof forms an isosceles triangle (ABC), the walls are perpendicular to the level floor (\overline{ED}), $\overline{AC} \parallel \overline{ED}$, F is the midpoint of \overline{AC} , and $\overline{BF} \perp \overline{AC}$.



During the week the Smiths plan to roof the cabin, there is 20% chance of rain each day.

Mr. Smith plans to build a 3-foot-wide walkway around the outside of the cabin, as shown in the floor plan. What will be the area, in square feet, of the top surface of the walkway?

- A. 171
- B. 324

- C. 360
D. 396
E. 720

Correct Answer: C

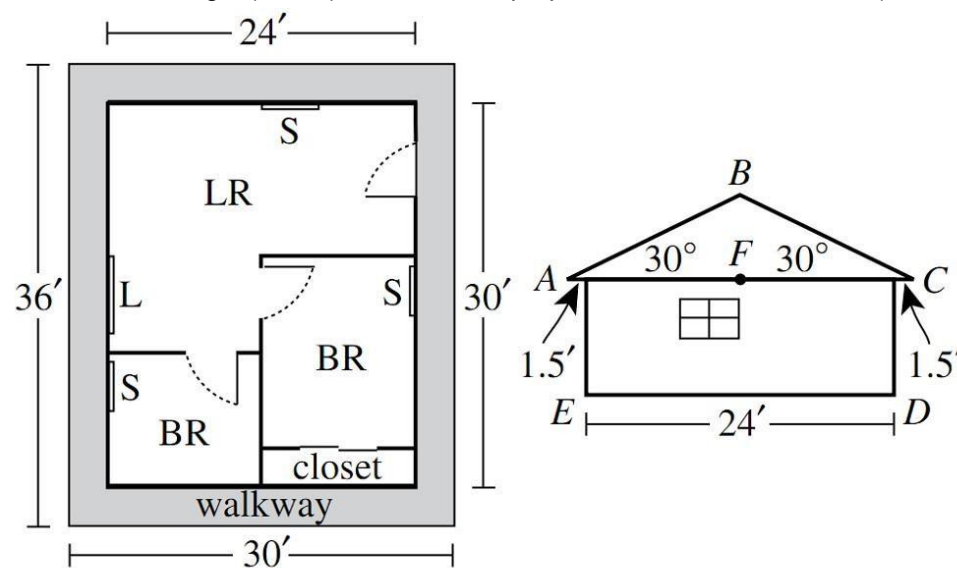
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Explanation

Explanation/Reference:

QUESTION 256

The Smith family is planning to build a 3-room cabin which consists of 2 bedrooms (BR) and 1 living room (LR). Shown below are the rectangular floor plan (left figure) and a side view of the cabin (right figure). In the side view, the roof forms an isosceles triangle ($\triangle ABC$), the walls are perpendicular to the level floor (\overline{ED}), $\overline{AC} \parallel \overline{ED}$, F is the midpoint of \overline{AC} , and $\overline{BF} \perp \overline{AC}$.



During the week the Smiths plan to roof the cabin, there is 20% chance of rain each day.

Mrs. Smith will install a ceiling fan in each room of the cabin and will place curtains over the 4 windows. Each of the ceiling fans has a price of \$52.00. The price of curtains for each small window (S) is \$39.50, and the price of curtains for the large window (L) is twice that for the small window.

Based on this information, which of the following values is closest to the total price Mrs. Smith will pay for curtains and ceiling fans?

- A. \$262
B. \$302
C. \$341
D. \$354
E. \$393

Correct Answer: D

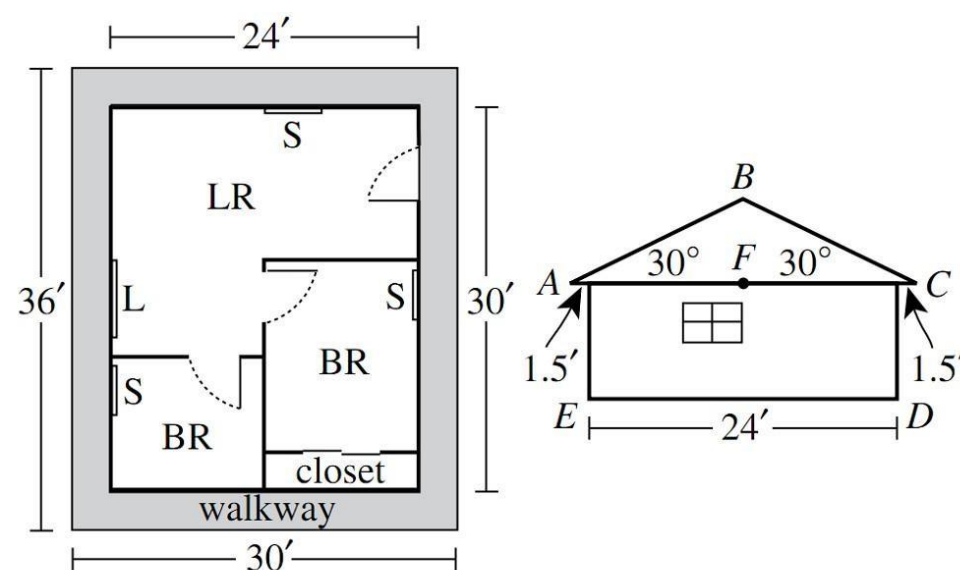
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Explanation

Explanation/Reference:

QUESTION 257

The Smith family is planning to build a 3-room cabin which consists of 2 bedrooms (BR) and 1 living room (LR). Shown below are the rectangular floor plan (left figure) and a side view of the cabin (right figure). In the side view, the roof forms an isosceles triangle ($\triangle ABC$), the walls are perpendicular to the level floor (\overline{ED}), $\overline{AC} \parallel \overline{ED}$, F is the midpoint of \overline{AC} , and $\overline{BF} \perp \overline{AC}$.



During the week the Smiths plan to roof the cabin, there is 20% chance of rain each day.

Mr. and Mrs. Smith plan to roof the cabin on 2 consecutive days. Assuming that the chance of rain is independent of the day, what is the probability that it will rain both days?

- A. 0.04
- B. 0.08
- C. 0.16
- D. 0.20
- E. 0.40

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 258 Which of the following expressions, when evaluated, equals an irrational number?

$$\sqrt{2} \div \sqrt{8}$$

$$\sqrt{8} \div \sqrt{2}$$

$$(\sqrt{8})^2$$

$$\sqrt{2} \times \sqrt{8}$$

$$\sqrt{2} + \sqrt{8}$$

- A.
- B.
- C.
- D.
- E.

Correct Answer: E

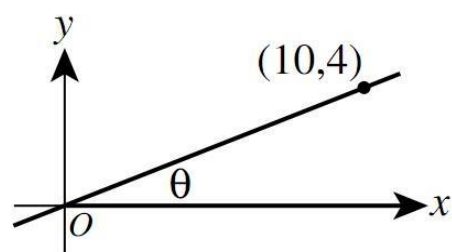
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Explanation

Explanation/Reference:

QUESTION 259

A line through the origin and (10, 4) is shown in the standard (x, y) coordinate plane below. The acute angle between the line and the positive x-axis has measure θ .



What is the value of $\tan \theta$?

$\sqrt{29} \div 2$

$2 \div \sqrt{29}$

$5 \div \sqrt{29}$

A.

B.

C.

D. $2/5$

E. $5/2$

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 260

The equation $|2x - 8| + 3 = 5$ has 2 solutions. Those solutions are equal to the solutions to which of the following pairs of equations?

A. $2x - 5 = 5$

$-2x - 5 = -5$ B.

$2x - 8 = 2$

$-2x - 8 = 2$ C.

$2x - 8 = 8$

$-(2x - 8) = 8$

D. $2x - 8 = 2$

$-(2x - 8) = 8$

E. $2x - 8 = 2$

$-(2x - 8) = 2$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

QUESTION 261

The frequency chart below shows the cumulative number of Ms. Hernandez's science students whose test scores fell within certain score ranges. All test scores are whole numbers.

Score range	Cumulative number of students
65–70	12
65–80	13
65–90	19
65–100	21

How many students have a test score in the interval 71 – 80?

- A. 1
- B. 6
- C. 8
- D. 12
- E. 13

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 262

The number of decibels, d , produced by an audio source can be modeled by the equation:

$$d = 10 \log\left(\frac{I}{K}\right),$$

where I is the sound intensity of the audio source and K is a constant.

How many decibels are produced by an audio source whose sound intensity is 1,000 times the value of K ?

- A. 4
- B. 30
- C. 40
- D. 100
- E. 10,000

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 263

Mario plays basketball on a town league team. The table below gives Mario's scoring statistics for last season. How many points did Mario score playing basketball last season?

Type of shot	Number attempted	Percent successful
1-point free throw	80	75%
2-point field goal	60	90%
3-point field goal	60	25%

- A. 129
- B. 190
- C. 213
- D. 330
- E. 380

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 264

The graph of $y = |x - 6|$ is in the standard (x, y) coordinate plane. Which of the following transformations, when applied to the graph of $y = |x|$, results in the graph of $y = |x - 6|$?

- A. Translation to the right 6 coordinate units
- B. Translation to the left 6 coordinate units
- C. Translation up 6 coordinate units
- D. Translation down 6 coordinate units
- E. Reflection across the line $x = 6$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 265

Toby wants to find the volume of a solid toy soldier. He fills a rectangular container 8 cm long, 6 cm wide, and 10 cm high with water to a depth of 4 cm. Toby totally submerges the toy soldier in the water. The height of the water with the submerged toy soldier is 6.6 cm.

Which of the following is closest to the volume, in cubic centimeters, of the toy soldier?

- A. 125
- B. 156
- C. 192
- D. 208
- E. 317

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 266

A box in the shape of a cube has an interior side length of 18 inches and is used to ship a right circular cylinder with a radius of 6 inches and a height of 12 inches. The interior of the box not occupied by the cylinder is filled with packing material. Which of the following numerical expressions gives the number of cubic inches of the box filled with packing material?

- A. $6(18)^2 - 2\pi(6)(12) - 2\pi(6)^2$
- B. $6(18)^2 - 2\pi(6)(12)$
- C. $18^3 - \pi(6)(12)^2$
- D. $18^3 - \pi(6)^2(12)$
- E. $18^3 - \pi(12)^3$

Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 267

A room has a rectangular floor that is 15 feet by 21 feet. What is the area of the floor in square *yards*?

- A. 24
- B. 35
- C. 36
- D. 105
- E. 144

Correct Answer: B

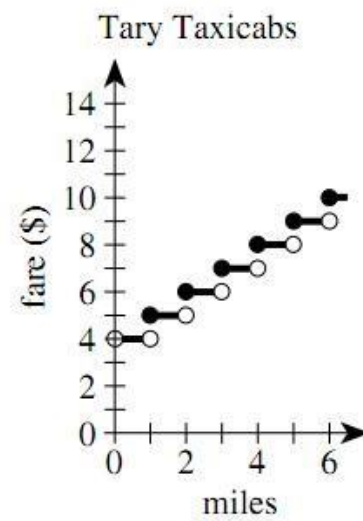
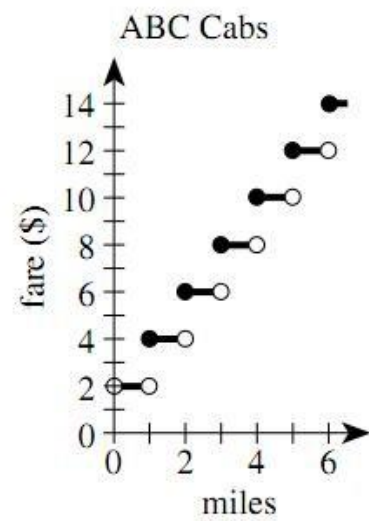
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Explanation

Explanation/Reference:

QUESTION 268

ABC Cabs and Tary Taxicabs both have an initial fare of a whole number of dollars for 1 passenger. The fare increases a whole number of dollars at each whole number of miles traveled. The graphs below show the 1-passenger fares, in dollars, for both cab companies for trips up to 6 miles. When the fares of the 2 cab companies are compared, what is the cheaper fare for a 5-mile trip?



- A. \$8
- B. \$9
- C. \$10
- D. \$11
- E. \$12

Correct Answer: B

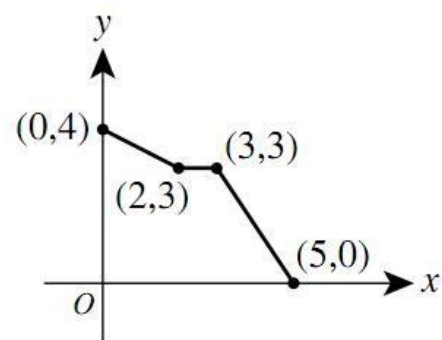
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Explanation

Explanation/Reference:

QUESTION 269

The graph of a function $y = f(x)$ consists of 3 line segments. The graph and the coordinates of the endpoints of the 3 line segments are shown in the standard (x, y) coordinate plane below. What is the area, in square coordinate units, of the region bounded by the graph of $y = f(x)$, the positive y -axis, and the positive x -axis?



- A. 10
- B. 13
- C. 14
- D. 15
- E. 20

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 270

The sum of 2 positive numbers is 151. The lesser number is 19 more than the square root of the greater number. What is the value of the greater number minus the lesser number?

- A. 19
- B. 66
- C. 85
- D. 91
- E. 121



Correct Answer: D

Section: (none)

Explanation

Explanation/Reference:

QUESTION 271 The list of numbers 41, 35, 30, X, Y, 15 has a median of 25. The mode of the list of numbers is 15.

To the nearest whole number, what is the mean of the list?

- A. 20
- B. 25
- C. 26
- D. 27
- E. 30

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 272 You are given the following system of equations:

$y = x^2$ $rx + sy = t$ where r , s , and t are integers. For which of the following will there be more than one (x, y) solution, with real-number coordinates, for the system?

- A. $r^2 + 4st > 0$
 B. $s^2 - 4rt > 0$ C. $r^2 - 4st < 0$ D. $s^2 - 4rt < 0$
 E. $s^2 + 4rt < 0$

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 273 The 3rd and 4th terms of an arithmetic sequence are 13 and 18, respectively. What is the 50th term of the sequence?

- A. 248
 B. 250
 C. 253
 D. 258
 E. 263

Correct Answer: A

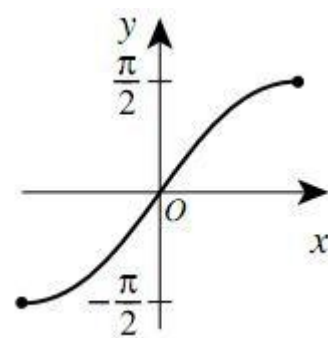
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Explanation

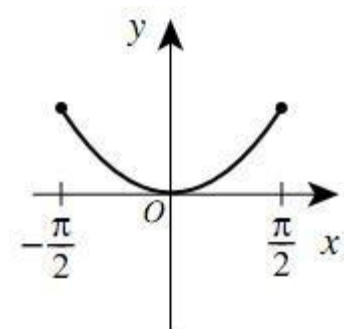
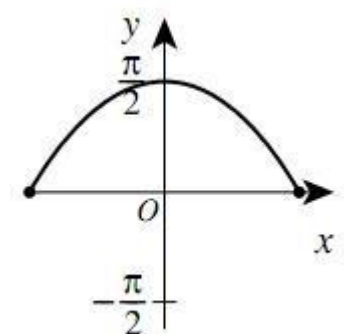
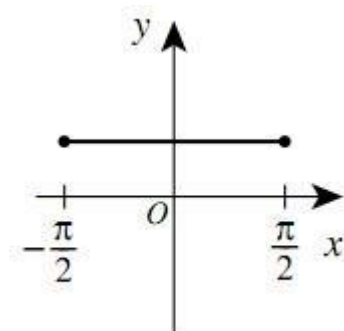
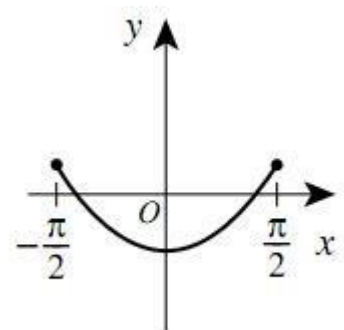
Explanation/Reference:



QUESTION 274 One of the following graphs in the standard (x, y) coordinate plane is the graph of $y = \sin^2 x + \cos^2 x$ over the domain $-\pi/2 \leq x \leq \pi/2$. Which one? A.



$\pi/2$. Which one? A.



B. C.

D.

E.

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 275 What is the period of the function
 $f(x) = \csc(4x)$?

- A. π
- B. 2π C. 4π
- D. $\pi/4$ E.
- $\pi/2$

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:



QUESTION 276

At the school carnival, Mike will play a game in which he will toss a penny, a nickel, and a dime at the same time. He will be awarded 3 points for each coin that lands with heads faceup. Let the random variable x represent the total number of points awarded on any toss of the coins.

What is the expected value of x ?

- A. 1
- B. $3/2$
- C. $9/2$
- D. 6E. 9

Correct Answer: C

Section: (none)

Explanation

Explanation/Reference:

QUESTION 277

For what positive real value of k , if any, is the determinant of the matrix $\begin{bmatrix} k & 4 \\ 3 & k \end{bmatrix}$ equal to k ? (Note: The determinant of matrix $\begin{bmatrix} a & c \\ b & d \end{bmatrix}$ equals $ad - bc$.)

- A. 3
- B. 4C. 12

- D. $\sqrt{12}$
 E. There is no such value of k .

Correct Answer: B

Section: (none)

Explanation

Explanation/Reference:

QUESTION 278

Given a positive integer n such that $i^n = 1$, which of the following statements about n must be true? (Note: $i^2 = -1$)

- A. When n is divided by 4, the remainder is 0. B.
 When n is divided by 4, the remainder is 1. C.
 When n is divided by 4, the remainder is 2.
 D. When n is divided by 4, the remainder is 3.
 E. Cannot be determined from the given information.

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 279 For $-\pi/2 \leq \theta \leq \pi/2$, $|\sin\theta| \geq 1$ is true for all and only the values of θ in which of the following sets?

- A. $\{-\pi/2, \pi/2\}$
 B. $\{\pi/2\}$
 C. $\{\theta \mid -\pi/2 < \theta < \pi/2\}$
 D. $\{\theta \mid -\pi/2 \leq \theta \leq \pi/2\}$
 E. The empty set

Correct Answer: A

Section: (none)

Explanation

Explanation/Reference:

QUESTION 280

Ray \overrightarrow{PK} bisects $\angle LPM$, the measure of $\angle LPM$ is $11x^\circ$, and the measure of $\angle LPK$ is $(4x + 18)^\circ$. What is the measure of $\angle KPM$?

- A. 12°
 B. $28\frac{2}{7}^\circ$
 C. 42°
 D. $61\frac{1}{5}^\circ$
 E. 66°

Correct Answer: E

Section: (none)

Explanation

Explanation/Reference:

