QUESTIONS & ANSWERS

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ACT Section Two: Math

Question: 263

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.

Answer: A

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: 264

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?

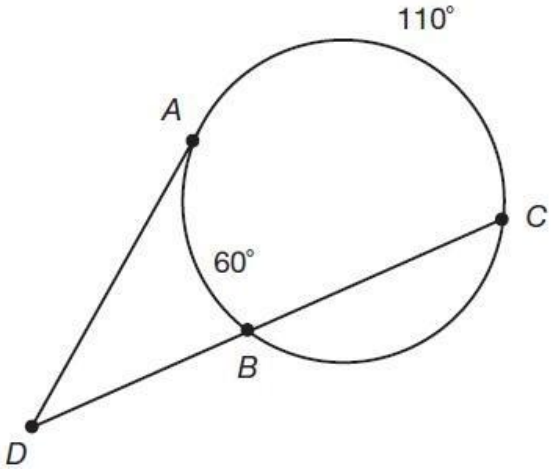
A. $200
B. $300
C. $500
D. $600
E. $800

Answer: D

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

Question: 265

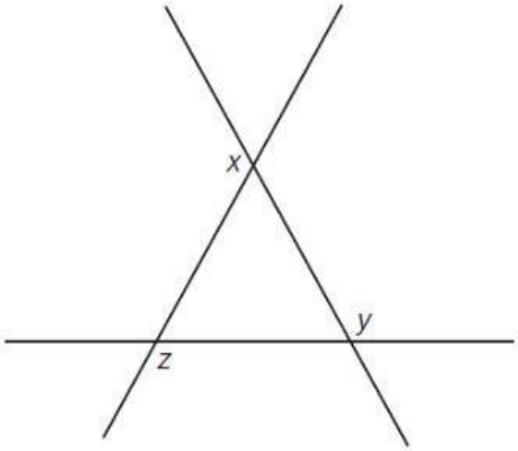
Given the following figure with one tangent and one secant drawn to the circle, what is the measure of $\angle ADB$?



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

Answer: E
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
$\overset{\frown}{AB}$
which is 60°, and
$\overset{\frown}{AC}$
which is 110°. Find half of the difference of the two arcs: 1/2 x (110 – 60) = 1/2 x 50 = 25°.

Question: 266



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.

Answer: B
Explanation:

There are 180º in a line: (x + (supplement of $\angle x$
)) + (y + (supplement of $\angle y$
)) + (z + (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 180º in a triangle, so those supplements sum to 180. Therefore, x + y + z + 180 = 540, and x + y + z = 360.

Question: 267

If the surface area of a cube is 384 cm^2 , what is the volume of the cube?
A. 64 cm3
B. 256 cm3
C. 512 cm3
D. 1152 cm3
E. 4096 cm3

Answer: C

Explanation:
The surface area of a cube is equal to 6 x e2, where e is the length of one edge of the cube; 6 x e2 = 384 cm, e3 = 64, e = 8 cm. The volume of a cube is equal to e3; (8 cm)3 = 512 cm3.

Question: 268

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

Answer: C
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 $\frac{9\times8\times7}{3\times2\times1} = \frac{504}{6} = 84$
.

Question: 269

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 hours
C. 16 hours
D. 18 hours
E. 24 hours

Answer: C,

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 x 12 = 96. Divide the total number of hours by the new number of people, 6: 96 ÷ 6 = 16. It takes six people 16 hours to clean the office.

Question: 270

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. 110
D. 121

E. 132

Answer: E

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 x 22 = 110 roses and 6 x 22 = 132 tulips in Lindsay's garden.

Question: 271

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)

Answer: D

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

Question: 272

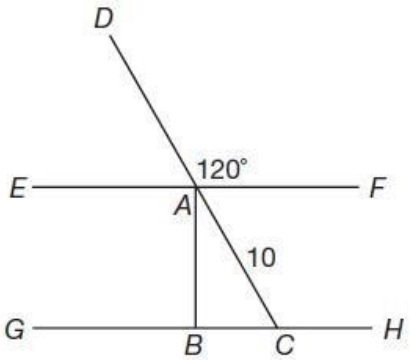
The expression
$\frac{(x^2+2x-15)}{(x^2+4x-21)}$
is equivalent to:
A. 5/7
B. x + 5
C. (x + 5) / (x + 7)
D. -5 / (2x – 7)
E. (2x – 15) / (4x – 21)

Answer: C

Explanation:
Factor the numerator and denominator and cancel like factors: (x^2 + 2x – 15) = (x + 5) x (x – 3) (x^2 + 4x – 21) = (x + 7) x (x – 3)
Cancel the (x – 3) term from the numerator and the denominator. The fraction reduces to (x + 5) / (x + 7).

Question: 273

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
B. $5\sqrt{2}$
C. $5\sqrt{3}$
D. $10\sqrt{2}$

E. $10\sqrt{3}$

Answer: C
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,* $\angle DHC = 120º$. $\angle DCH$ and $\angle ACB$ *form a line. There are 180º in a line, so the measure of of* $\angle ACB = 180º - 120º = 60º$*. Triangle ABC is a 30-60-90 right triangle, which means that the length of the hypotenuse, AC, is equal to twice the length ofthe 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 v3 times the length of the other leg, BC. Therefore, the length of AB is 5√3.*

Question: 274

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.

Answer: A

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: 275

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

Answer: D

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 x 5 x 4 x 3 = 360.

Question: 276

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

Answer: B

Explanation:
30 men x 42 square feet = 1260 square feet of space; 1260 square feet ÷ 35 men = 36 square feet; 42 – 36 = 6, so each man will have 6 less square feet of space.

Question: 277

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

Answer: B

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

Question: 278

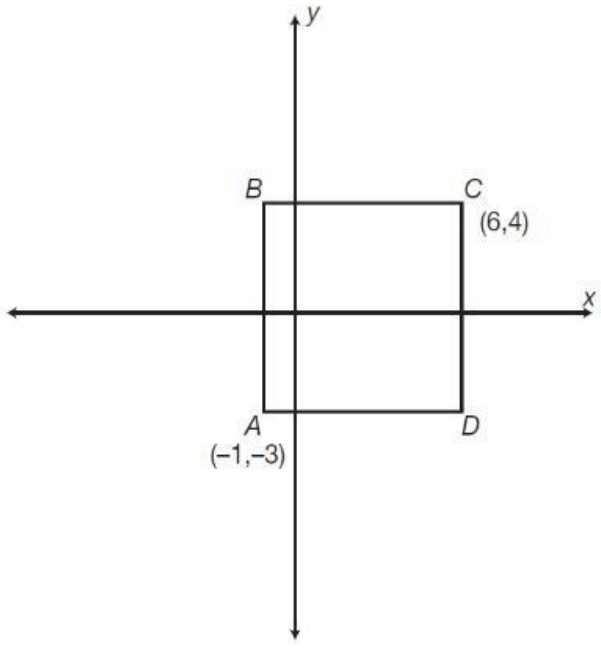
Line y = 2/3x – 5 is perpendicular to line:
A. y = 2/3x + 5
B. y = 5 – 2/3x
C. y = -2/3x – 5
D. y = 2/3x – 5
E. y = -2/3x + 5

Answer: E

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

Question: 279

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)

Answer: B

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: 280

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

Answer: A

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