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1. Simplify. $-s \cdot \sqrt[3]{128r} + \sqrt[3]{54rs^3}$

A. $-s^3 \cdot \sqrt[3]{2r}$
B. $-s \cdot \sqrt[3]{182r^2s^3}$
C. $-s^2 \cdot \sqrt[3]{74r}$
D. $-s \cdot \sqrt[3]{2r}$
E. $-10s \cdot \sqrt[3]{3}$

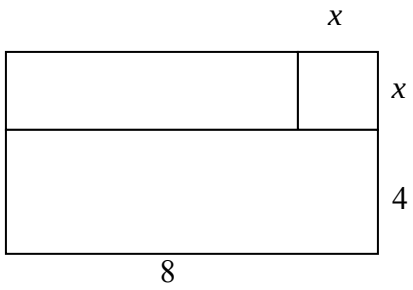
2. Find the sum of all positive integers *b* such that $x^2 + bx + 20$ can be factored.

A. 42
B. 37
C. 9
D. 20
E. 64

3. A piece of cardboard measures 10 feet by 10 feet. Squares with side of length *x* are cut from each of the four corners and then the resulting flaps are folded up. Express the outside surface area of the open box in terms of *x*.

A. $-5x^2 + 40x + 100$
B. $-4x^2 + 100$
C. $4x^2 - 8x + 140$
D. $-3x^2 + 20x + 100$
E. $4x^2 - 40x + 100$

4. Express the area of the given rectangle in terms of *x*.



A. $x^2 + 12x + 32$
B. $8x^2 + 32$
C. $32x$
D. $-4x^4 + 32x^3$
E. $8x + 32$

5. A ball is thrown at 19.6 meters per second from a height of 58.8 meters. The equation $h(t) = -4.9t^2 + 19.6t + 58.8$ represents the height of the ball, *h*, in meters, at time *t* seconds after it's been thrown. When does the ball hit the ground?

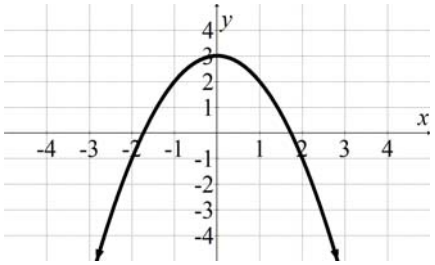
A. 2 seconds
B. 4 seconds
C. 12 seconds
D. 6 seconds
E. 8 seconds

6. *Give a factor* of the quadratic function $f(x) = ax^2 + bx + c$, where *a*, *b*, and *c* are real numbers and $a \neq 0$, whose graph passes through $(-1,-4)$, $(2,35)$ and $(1,10)$.

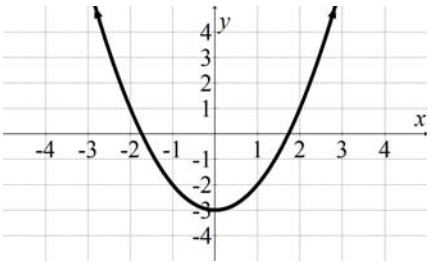
A. $4x+1$
B. $2x+3$
C. $-x-3$
D. $x-7$
E. $x-9$

7. Which of the following graphs represents $y = \left|-x^2 + 3\right|$?

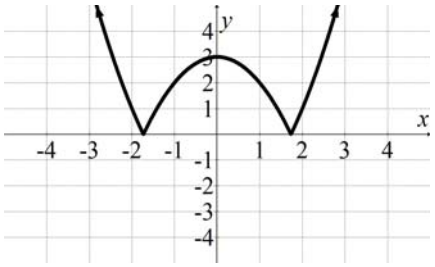
A.



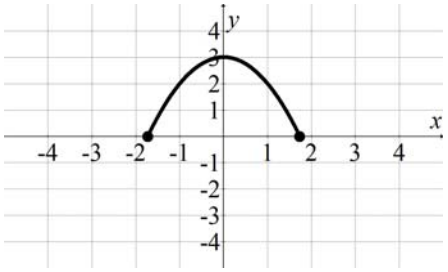
B.



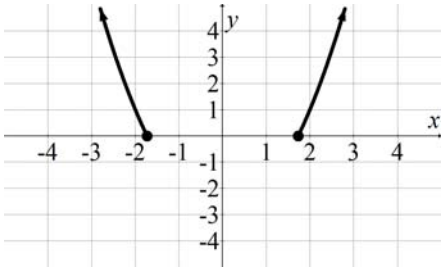
C.



D.



E.



8. Let $x = \frac{3}{y}$ and $y^2 = 5 - x^2$ such that x and y are nonzero, real numbers.
Find $(x - y)(x - y)$.

A. 2
B. 5
C. -2
D. 3
E. -1

9. You own a newsstand. Your weekly profit, in dollars, for selling x comic books is given by the function $f(x) = -21 + 4x + x^2$. How many comic books do you need to sell to keep your profit positive?

A. Between 3 and 7
B. More than 7
C. More than 3
D. From 3 to 7, including 3 and 7
E. More than 3, but up to and including 7

10. An urn contains 11 red marbles, 13 blue marbles, 14 green marbles, and 10 yellow marbles. Opal chooses one marble at random from the urn. What is the probability that the chosen marble is yellow?

A. $1/10$
B. $1/48$
C. $5/24$
D. $1/14$
E. $5/19$

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11. A group of 100 students were surveyed regarding which courses they were enrolled in last semester . The results follow:

53 were enrolled in Math
41 were enrolled in English
61 were enrolled in Chemistry
14 were enrolled in Math and English
25 were enrolled in English and Chemistry
12 were enrolled in all three subjects mentioned here
4 were not enrolled in any of the three courses mentioned here

How many students surveyed were enrolled in exactly two of the three courses mentioned here?

A. 15
B. 35
C. 49
D. 12
E. 33

12. Let $\frac{-3x-a}{-4x+1}=1$. Find the value of a for which the equation is undefined.

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

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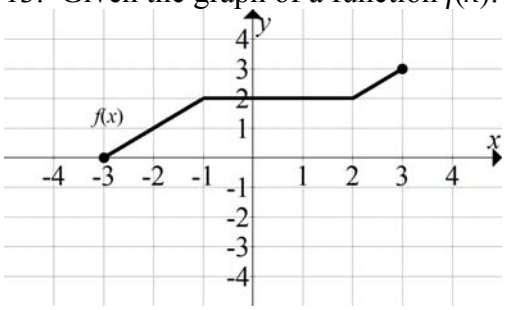
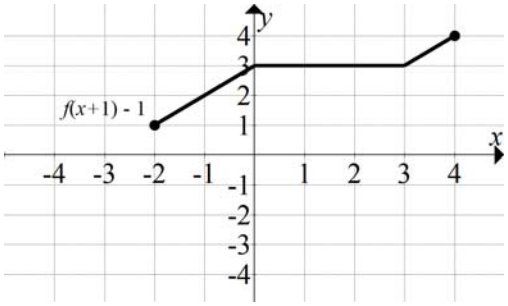
13. Given the graph of a function $f(x)$:

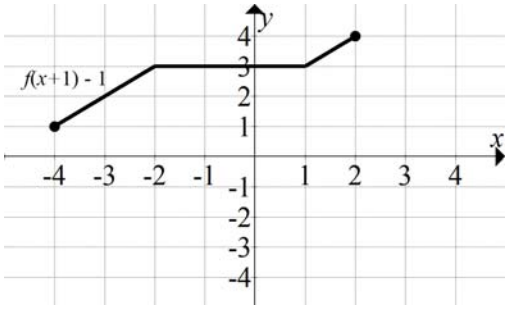


Which of the following graphs is the graph of $f(x+1)-1$?

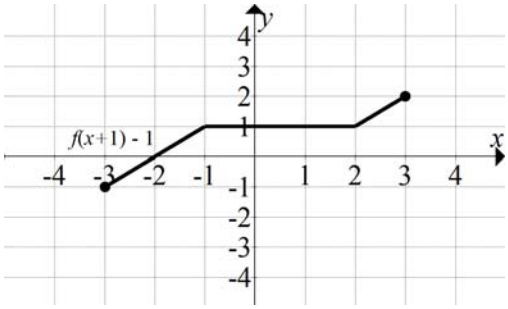
A.



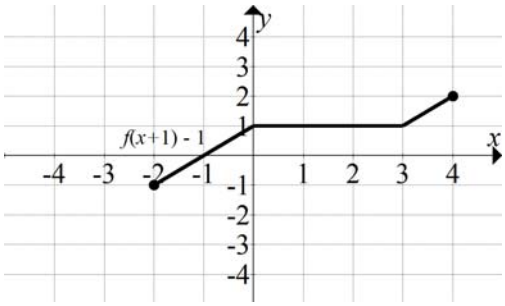
B.



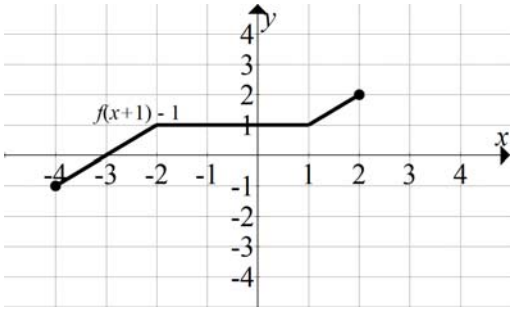
C.



D.



E.



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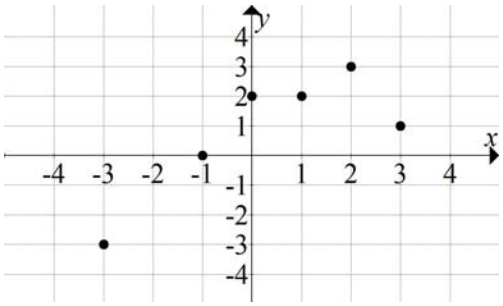
14. Given $A = b\frac{d}{c} + e$, solve for d.

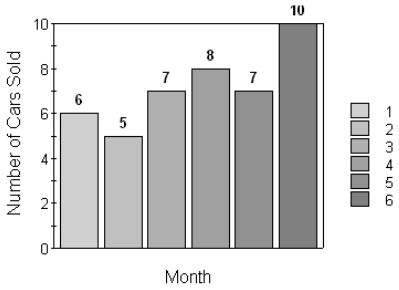
A. $d = cA - be$
B. $d = cA - ce - b$
C. $d = \frac{cA - ce}{b}$
D. $d = \frac{cA - e}{b}$
E. $d = bcA - bce$

15. Which of the following relations is/are functions?

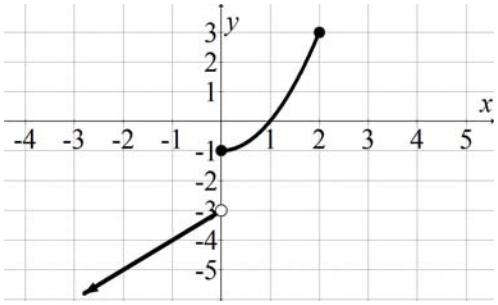
I.



II.



III.



IV. $a = -5b + 9$

V.

Person	*Exercise Class*
Annie	Spin
Fred	Yoga
Mary	Zumba

A. I, II, III, IV
B. I, III, IV
C. II, III, V
D. II, IV
E. IV

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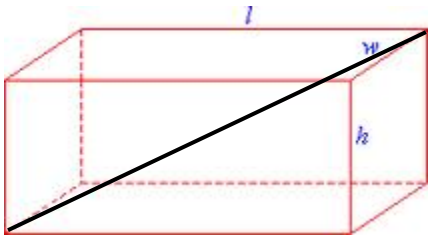
16. Given the following rectangular solid, with length, *l*, 5 cm, width, *w*, 3 cm, and height, *h*, 4 cm. Find the length of the diagonal shown inside the figure. *The figure may not be drawn to scale.*



A. $\sqrt{34}$ *cm*
B. 50 *cm*
C. $5\sqrt{2}$ *cm*
D. $\sqrt{59}$ *cm*
E. 5 *cm*

17. A binary operation ☺ is define as $a \☺ b = ab - 2ab$, where *a* and *b* are integers. Find $(2 \☺ 5) \☺ 3$

A. 0
B. 30
C. 90
D. 60
E. –2

18. Write the equation of a cubic polynomial with leading coefficient -2 whose graph passes through (2, 16) and is tangent to the *x*-axis at the origin.

A. $f(x) = -2x^3 + 8x^2$
B. $f(x) = 2x^3 + 8x^2$
C. $f(x) = -2x^3$
D. $f(x) = 2x^3$
E. $f(x) = -2x^3 - 8x^2$

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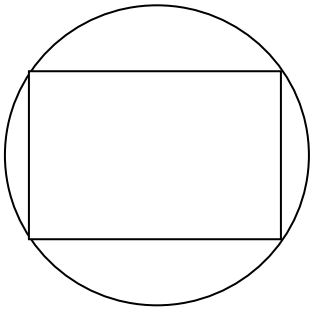
19. A rectangle is inscribed in a circle of radius 4 m. Find the area of the rectangle.



A. 64 square meters
B. 8 square meters
C. 4 square meters
D. 32 square meters
E. 16 square meters

20. Which is the correct ordering of 3^{28}, 4^{14} , 5^{21}.

A. $3^{28} < 4^{14} < 5^{21}$
B. $4^{14} < 5^{21} < 3^{28}$
C. $4^{14} < 3^{28} < 5^{21}$
D. $3^{28} < 5^{21} < 4^{14}$
E. $5^{21} < 3^{28} < 4^{14}$

21. A deck of cards contains 14 red cards and 17 blue cards. Two cards are drawn in succession and without replacement. What is the probability that the two cards drawn are the same color?

A. $89/186$
B. $454/961$
C. $485/961$
D. $238/465$
E. $227/465$

22. A box contains 10 quarters, 13 dimes, and 11 pennies. If a coin from the box is drawn at random, what is the average value of the draw? *Round to the nearest tenth.*

A. 11.3 cents
B. 2.8 cents
C. 14.4 cents
D. 10 cents
E. 11.5 cents

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23. A right triangle has a perimeter of 16 inches and an area of 10 square inches. Find the length of the hypotenuse.

A. 2 inches
B. $27/4$ inches
C. 8 inches
D. 4 inches
E. $59/8$ inches

24. Which of the following is greater than its reciprocal?
A. 3
B. -3
C. -1
D. 0
E. 1

25. A group of 15 people were surveyed regarding the number of meals they eat each day. The results are displayed in the following bar graph.

What fraction represents the people surveyed eat at least three meals a day?

A. $1/15$
B. $2/5$
C. $8/15$
D. $3/5$
E. $7/15$