

1. Given the points  $A(-3, 4)$  and  $B(5, 0)$ , which of the following statements is/are true?

- I. The point  $A$  lies in Quadrant II
- II. The distance from point  $A$  to point  $B$  is  $4\sqrt{5}$
- III. The point  $C(4, -2)$  is the midpoint of line segment  $AB$ .

- A. I and II only
- B. II and III only
- C. II only
- D. All of the statements are true
- E. None of the statements are true

2. Given that the point  $A(-a, 2a)$  lies in the second quadrant, and is a distance of 5 from the point  $P(3, -1)$ , find the value of  $a$ .

- A.  $a$  is less than  $-2$
- B.  $a$  is between  $-2$  and  $0$
- C.  $a$  is between  $0$  and  $2$
- D.  $a$  is greater than  $2$
- E. There is more than one possible value of  $a$

3. Find the center and radius of the following circle.

$$x^2 + y^2 - 4x + 16y + 64 = 0$$

- A.  $C(2, -8); r = 2$
- B.  $C(2, -8); r = 4$
- C.  $C(-2, 8); r = 2$
- D.  $C(-2, 8); r = 4$
- E. None of the above

4. Find the general form of the equation of a line with an  $x$ -intercept of  $-5$  and a  $y$ -intercept of  $3$ .

- A.  $5x + 3y = 9$
- B.  $5x - 3y = 15$
- C.  $3x - 5y = 25$
- D.  $3x - 5y = -15$
- E. None of the above

5. Which of the following equations is perpendicular to  $2x - 3y = 7$ .

- A.  $y = \frac{2}{3}x + \frac{5}{3}$
- B.  $y = -\frac{3}{2}x + 3$
- C.  $y = -\frac{2}{3}x - \frac{2}{3}$
- D.  $y = \frac{3}{2}x + 2$
- E. None of the above

6. Given the function  $f(x) = 1 - x^2$ , find and simplify  $\frac{f(a+h)-f(a)}{h}$ . (assume  $h \neq 0$ )

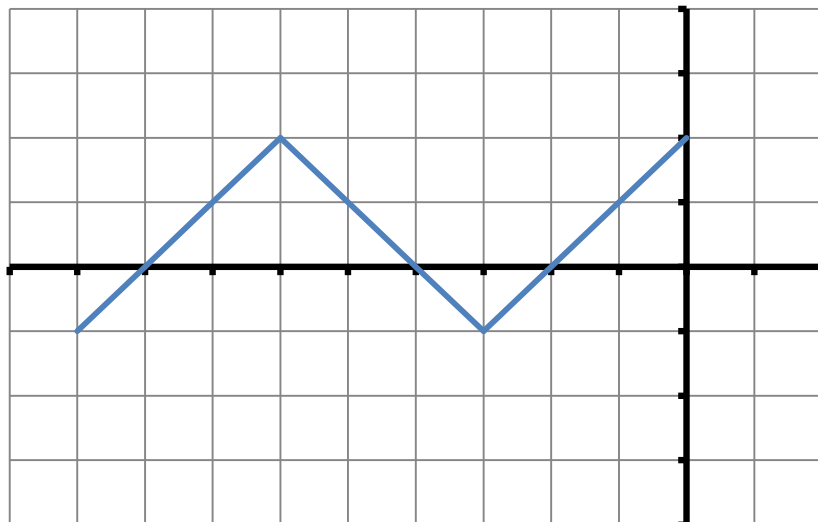
- A.  $-h$
- B.  $-2ah - h$
- C.  $-2a - h$
- D.  $-2a^2 - 2a - h$
- E. None of the above

7. If  $f(x) = \sqrt{2 - 3x}$  and  $g(x) = \frac{1}{x^2 + 4}$ , which of the following statements is/are true?

- |      |  |
|------|--|
| I.   | The domain of $f$ is $[0, \infty)$                   |
| II.  | The domain of $g$ is all real numbers except $\pm 2$ |
| III. | $f(0) = \sqrt{2}$                                    |

- A. I and III only  
 B. II and III only  
 C. III only  
 D. All of the statements are true  
 E. None of the statements are true

8. Given the graph of the function  $f$ , find all such  $x$  such that  $f(x) > 1$ . (each tick mark represents 1 unit)

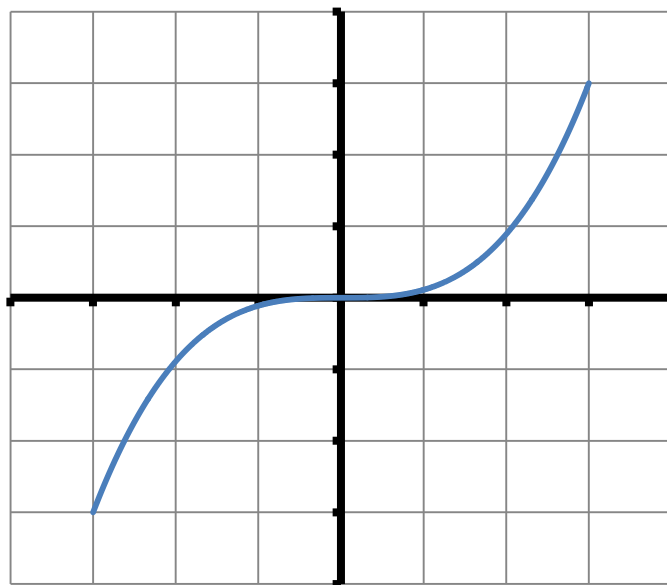


- A.  $(-7, -5) \cup (-1, 0]$   
 B.  $[-9, -7) \cup (-5, -1)$   
 C.  $[-9, 0]$   
 D. The function is never greater than 1  
 E. None of the above

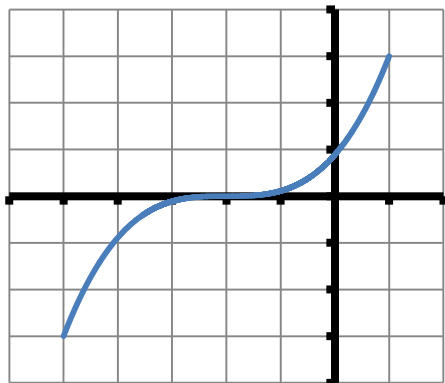
9. The point  $P(5, -3)$  is on the graph of a basic function,  $y = f(x)$ . Find the corresponding point on the graph of  $y = 4f\left(-\frac{1}{3}x\right) - 2$ .

- A.  $(-15, -20)$   
 B.  $(-15, -14)$   
 C.  $\left(-\frac{5}{3}, -20\right)$   
 D.  $\left(-\frac{5}{3}, -14\right)$   
 E. None of the above

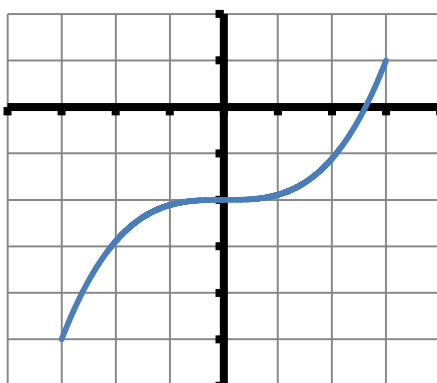
10. The graph of a function  $f$  with domain  $[-3, 3]$  is shown below. Find the graph of the function  $y = f(x - 2)$ . (each tick mark represents 1 unit)



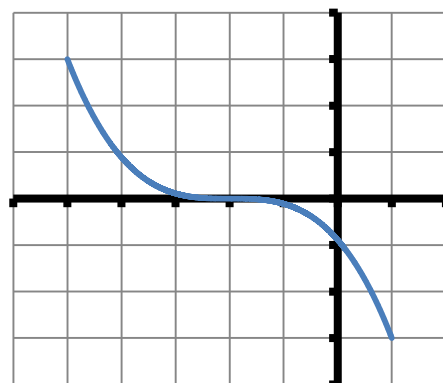
A.



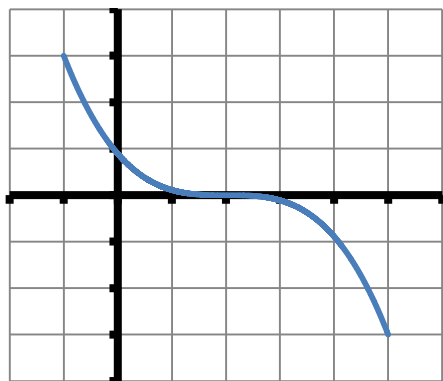
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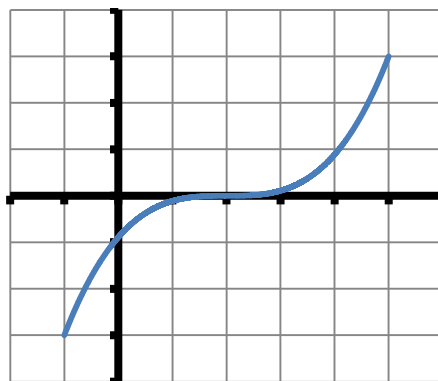
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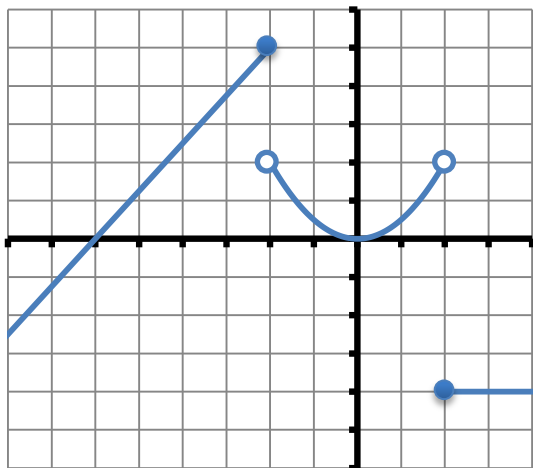
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E.

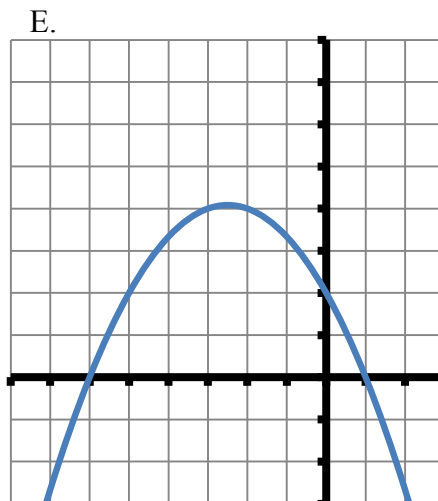
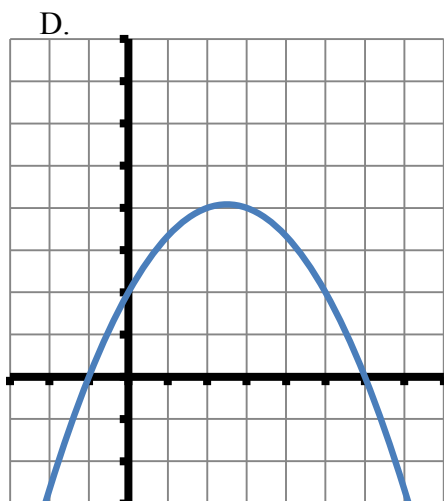
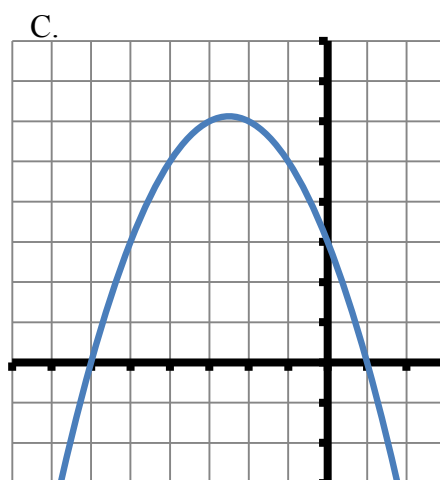
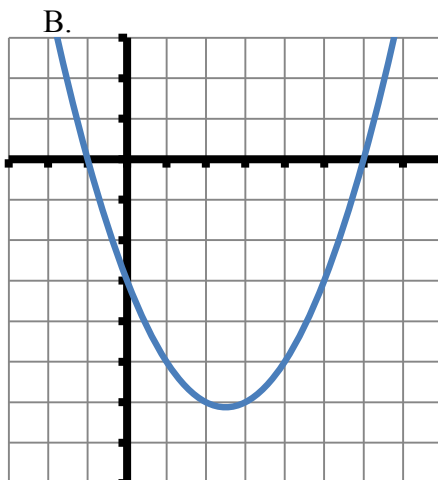
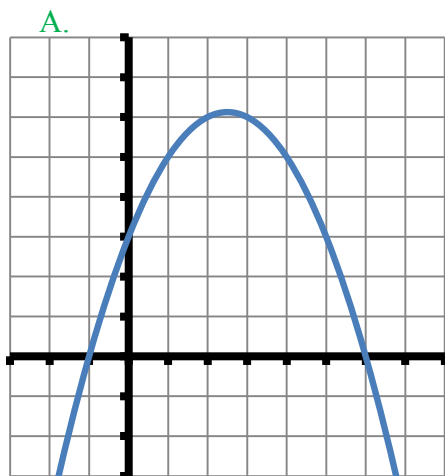


11. Determine which of the following statements about the graph of the function  $f$  given below is true.  
(each tick mark represents 1 unit)



- A. The function is increasing on the intervals  $(-\infty, -2] \cup [2, \infty)$   
 B. The range of  $f$  is  $(-\infty, \infty)$   
 C.  $f(-2) = 2$   
 D.  $f(2) = -4$   
 E. The domain of the function is all real numbers except  $-2$  and  $2$

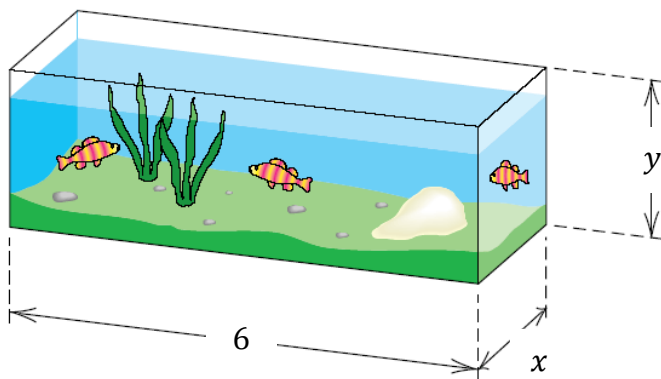
12. Which of the following is the graph of  $f(x) = -\frac{1}{2}(x - 6)(x + 1)$ ?  
(each tick mark represents one unit on the graph)



13. Ten years ago a house was purchased for \$215,000. This year, it was appraised at \$179,000. Assume that the value of the house ( $V$ ) after its purchase is linearly related to time  $t$  (in years), where  $t$  is the number of years since the house was purchased. Express  $V$  in terms of  $t$ .

- A.  $V = -3,600t + 179,000$   
 B.  $V = 3,600t - 215,000$   
 C.  $V = -3,600t + 215,000$   
 D.  $V = 3,600t + 179,000$   
 E. None of the above

14. An aquarium of 6 feet wide is to have a volume of  $20 \text{ ft}^3$ . Let  $x$  denote the length of the base and  $y$  the height of the aquarium (see the figure). Assuming the aquarium has an open top, express the total number of square feet of glass needed  $S$  as a function of  $x$ .



- A.  $S(x) = \frac{20x^2}{3} + \frac{58x}{3}$   
 B.  $S(x) = 6x + \frac{40}{x} + \frac{20}{3}$   
 C.  $S(x) = 18x^2 + 20x + 120$   
 D.  $S(x) = 6x + \frac{240}{x} + 40$   
 E. None of the above

15. A long jumper jumps 8 meters. Assume that the path of his flight is parabolic and his maximum height is 1 meter. Find the equation for his path.

- A.  $y = -\frac{1}{16}(x - 4)^2 + 1$   
 B.  $y = -\frac{1}{16}(x + 4)^2 + 1$   
 C.  $y = -\frac{1}{64}(x - 8)^2 + 1$   
 D.  $y = -\frac{1}{64}(x + 8)^2 + 1$   
 E. None of the above