

# **NEXT-GENERATION** **Advanced Algebra** **and Functions**

## Sample Questions

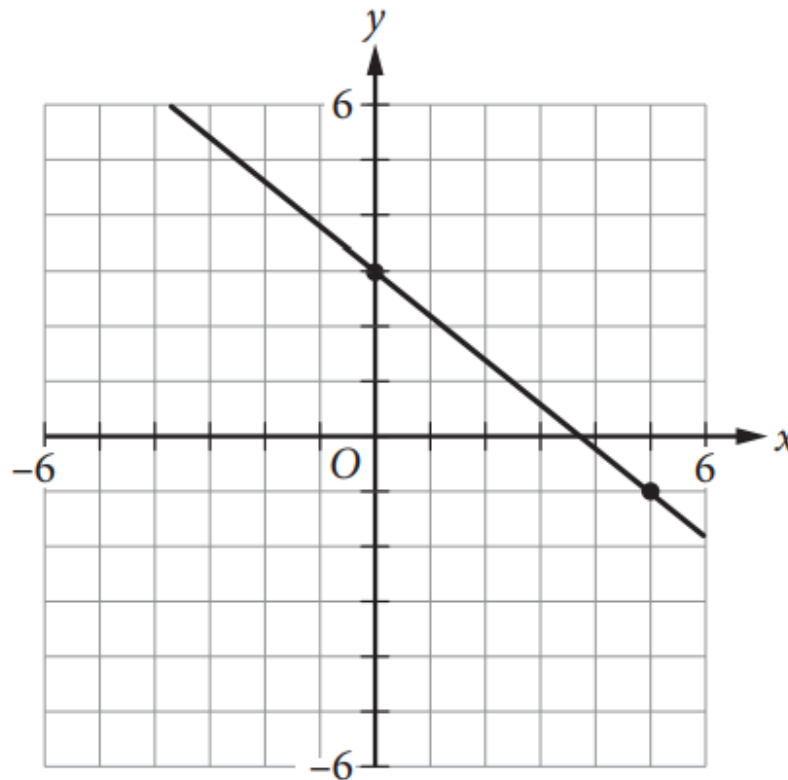
Some questions are skipped as they are outside the context of this class

**Use function notation to find outputs (237-249 range)**

1. Function  $g$  is defined by  $g(x) = 3(x + 8)$ . What is the value of  $g(12)$ ?
  - A.  $-4$
  - B.  $20$
  - C.  $44$
  - D.  $60$

## Find equation of line perpendicular (237-249 range)

2.



Which of the following is an equation of the line that passes through the point  $(0, 0)$  and is perpendicular to the line shown above?

A.  $y = \frac{5}{4}x$

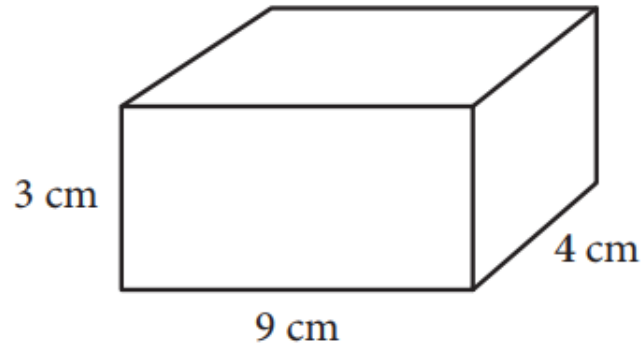
B.  $y = \frac{5}{4}x + 3$

C.  $y = -\frac{4}{5}x$

D.  $y = -\frac{4}{5}x + 3$

## Find surface area of prisms (236 and below range)

3.



The surface area of a right rectangular prism can be found by finding the sum of the area of each of the faces of the prism. What is the surface area of a right rectangular prism with length 4 centimeters (cm), width 9 cm, and height 3 cm? (Area of a rectangle is equal to length times width.)

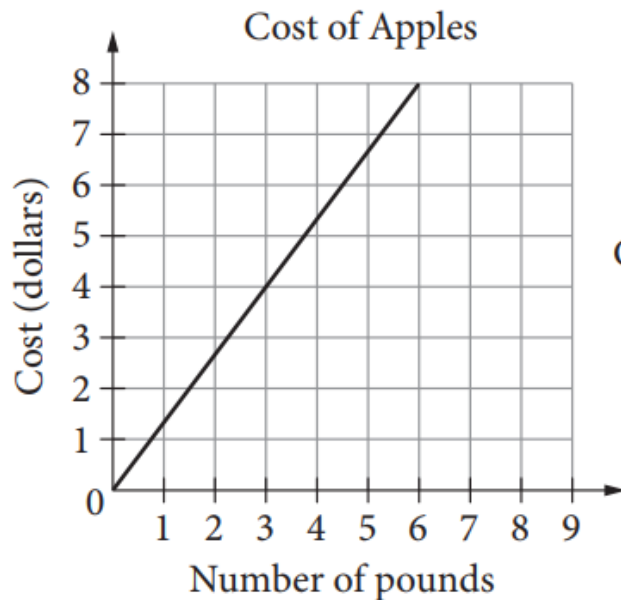
- A.  $75 \text{ cm}^2$
- B.  $108 \text{ cm}^2$
- C.  $120 \text{ cm}^2$
- D.  $150 \text{ cm}^2$

## Multiply polynomials (237-249 range)

4. Which of the following expressions is equivalent to  $(x + 7)(x^2 - 3x + 2)$ ?
- A.  $x^3 - 3x^2 + 2x + 14$
  - B.  $x^3 + 4x^2 - 19x + 14$
  - C.  $x^3 - 3x + 14$
  - D.  $x^2 - 2x + 9$

## Interpet linear contexts (236 and below range)

5.



Cost of Pears:  $C = \frac{7}{5}p$

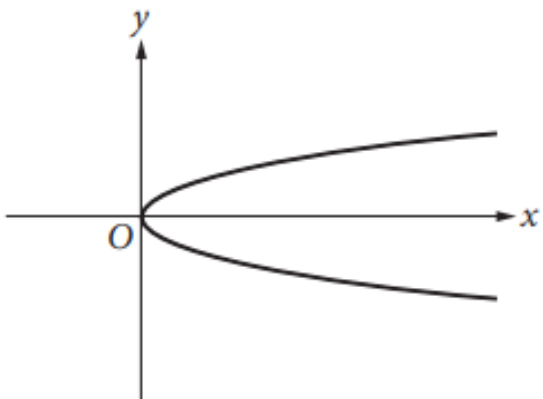
The graph above shows the cost, in dollars, of apples as a function of the number of pounds of apples purchased at a particular grocery store. The equation above defines the cost  $C$ , in dollars, for  $p$  pounds of pears at the same store. Which of the following statements accurately compares the cost per pound of apples and the cost per pound of pears at this store?

- A. Apples cost approximately \$0.07 less per pound than pears do.
- B. Apples cost approximately \$0.04 less per pound than pears do.
- C. Apples cost approximately \$0.73 less per pound than pears do.
- D. Apples cost approximately \$0.62 more per pound than pears do.

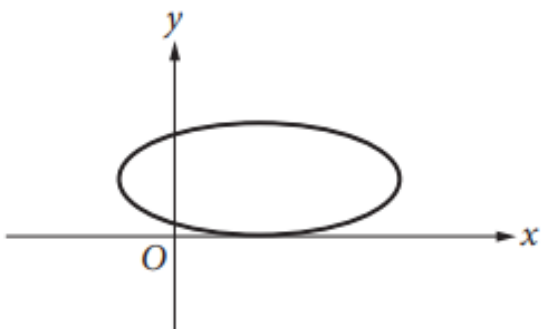
## State whether a graph is a function (237-249 range)

6. Which of the following is the graph of a function where  $y = f(x)$ ?

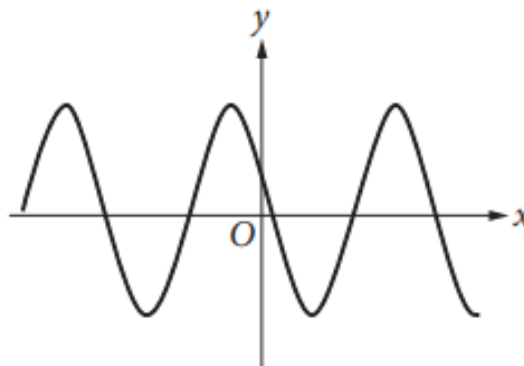
A.



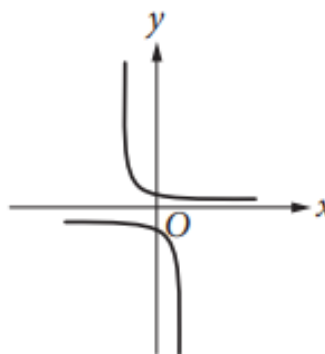
B.



C.



D.



## Factor Quadratics (237-249 range)

7. Which of the following expressions is equivalent to  $3x^2 + 6x - 24$ ?
- A.  $3(x + 2)(x - 4)$
  - B.  $3(x - 2)(x + 4)$
  - C.  $(x + 6)(x - 12)$
  - D.  $(x - 6)(x + 12)$



**Evaluate an expression (236 and below range)**

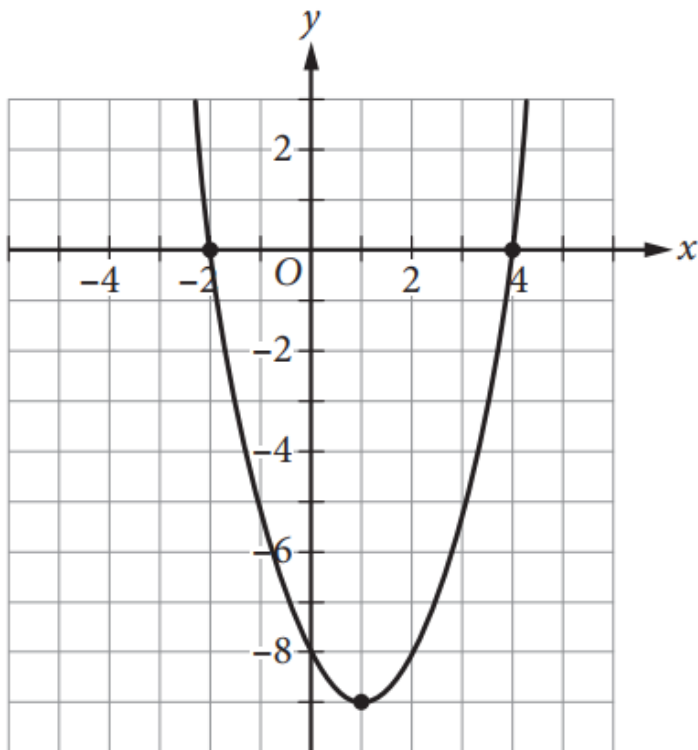
9.  $x^2 + 5x - 9 = 5$

Which of the following values of  $x$  satisfies the equation above?

- A. 7
- B. 3
- C. -2
- D. -7

## Make connections between graphs and equations for a quadratic (250-262 range)

10. The graph of  $y = f(x)$  is shown in the  $xy$ -plane below.



Which of the following equations could define  $f(x)$ ?

- A.  $f(x) = x^2 - 2x - 8$
- B.  $f(x) = -x^2 + 2x - 8$
- C.  $f(x) = (x - 2)(x + 4)$
- D.  $f(x) = -(x - 1)^2 - 9$

**State domain and range for a quadratic (237-249 range)**

11. Which of the following best describes the range of  $y = -2x^4 + 7$ ?
- A.  $y \leq -2$
  - B.  $y \geq 7$
  - C.  $y \leq 7$
  - D. All real numbers

**Solve factored quadratics (237-249 range)**

12. For which of the following equations is  $x = 6$  the only solution?
- A.  $(6x)^2 = 0$
  - B.  $(x - 6)^2 = 0$
  - C.  $(x + 6)^2 = 0$
  - D.  $(x - 6)(x + 6) = 0$

**Use function notation with functions as inputs (250-262 range)**

13. If  $f(x) = x^2 + 3x + 1$ , what is  $f(x + 2)$ ?

A.  $x^2 + 3x + 3$

B.  $(x + 2)^2 + 3(x + 2) + 1$

C.  $(x + 2)(x^2 + 3x + 1)$

D.  $x^2 + 3x + 9$

**Solve radical equations (237-249 range)**

14. What, if any, is a real solution to  $\sqrt{5x+1} + 9 = 3$ ?

A.  $-\frac{1}{5}$

B. 7

C.  $\frac{143}{5}$

D. There is no real solution.

**Solve rational equations (237-249 range)**

15. If  $x \neq -2$  and  $x \neq -\frac{3}{2}$ , what is the solution to

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

A. 3 and 5

B. 2 and  $-\frac{3}{2}$

C. -2 and  $\frac{3}{2}$

D. -3 and -5

**Write simple trig ratios (250-262 range)**

20. In triangle  $ABC$ , angle  $C$  is a right angle. If  $\cos A = \frac{5}{8}$ , what is the value of  $\cos B$ ?

A.  $\frac{3}{8}$

B.  $\frac{5}{8}$

C.  $\frac{\sqrt{39}}{8}$

D.  $\frac{\sqrt{89}}{8}$