

CHAPTER EXERCISE: Answers for this chapter start on page 279.

A calculator should NOT be used on the following questions.

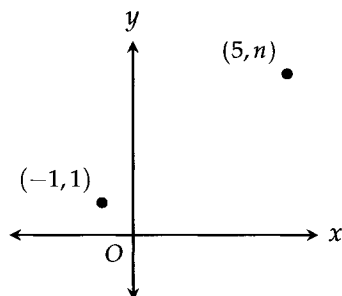
1

What is the equation of the line parallel to the y -axis and 3 units to the right of the y -axis?

- A) $x = -3$
- ☒ B) $x = 3$
- C) $y = -3$
- D) $y = 3$

1 3

2



Note: Figure not drawn to scale.

In the figure above, the slope of the line through the two plotted points is $\frac{1}{3}$. What is the value of n ?

- A) 9
- B) 4
- ☒ C) 3
- D) $\frac{7}{3}$

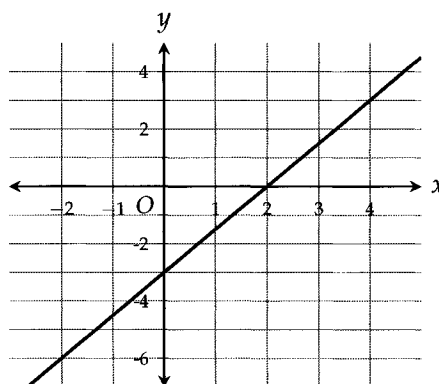
3

In the xy -plane, points $(-3, 5)$ and $(6, 8)$ lie on line l . Which of the following points is also on line l ?

- ☒ A) $(0, 6)$
- B) $(3, 8)$
- C) $(9, 10)$
- D) $(12, 11)$

$$\frac{1}{3}x = 6$$

4



The graph of line l is shown in the xy -plane above. Which of the following is an equation of a line that is parallel to line l ?

- A) $y = -\frac{2}{3}x + 2$
- B) $y = \frac{2}{3}x + 10$
- ☒ C) $y = \frac{3}{2}x - 4$
- D) $y = 3x - 1$

5

$$y = ax + b$$

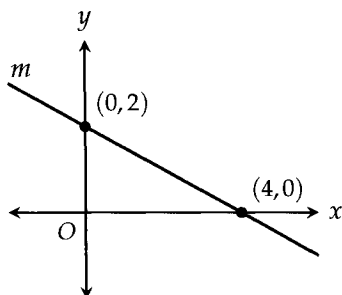
$$y = -bx$$

The equations of two lines in the xy -plane are shown above, where a and b are constants. If the two lines intersect at $(2, 8)$, what is the value of a ?

- A) 2
B) 4
☒ C) 6
D) 8
- b = -4*

A calculator is allowed on the following questions.

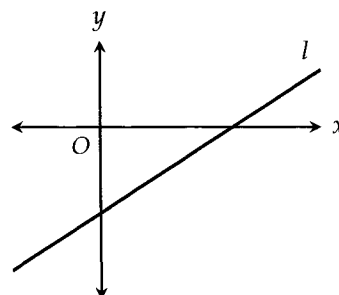
6



What is the slope of the line m in the figure above?

- A) -2
☒ B) $-\frac{1}{2}$
C) $\frac{1}{4}$
D) $\frac{1}{2}$

7



Line l in the xy -coordinate system above can be represented by the equation $y = mx + b$. Which of the following must be true?

- A) $mb > 0$
☒ B) $mb < 0$
C) $mb = 0$
D) $mb = 1$

8

The line $y = -2x - 2$ is perpendicular to line l . If these two lines have the same y -intercept, which of the following could be the equation of line l ?

- A) $y = -2x - 2$
B) $y = 2x - 2$
C) $y = -\frac{1}{2}x - 2$
☒ D) $y = \frac{1}{2}x - 2$
- 2. m = -1*

9

The slope of line l is $\frac{1}{2}$ and its y -intercept is 3.

What is the equation of the line perpendicular to line l that goes through $(1, 5)$?

- A) $y = -2x + 3$
☒ B) $y = -2x + 7$
C) $y = -\frac{1}{2}x + \frac{11}{2}$
D) $y = \frac{1}{2}x + \frac{9}{2}$
- 2*

10

A line with a slope of $\frac{2}{3}$ passes through the points $(1, 4)$ and $(x, 10)$. What is the value of x ?

- A) 4
- B) 6
- C) 8
- ☒ D) 10

$$b = \frac{16}{3}$$

11

If $f(x)$ is a linear function such that $f(2) \leq f(3)$, $f(4) \geq f(5)$, and $f(6) = 10$, which of the following must be true?

- A) $f(3) < f(0) < f(4)$ ✗
- B) $f(0) = 0$ ✗
- C) $f(0) > 10$
- ☒ D) $f(0) = 10$

$$f(0) \quad f(2) \quad f(3) \quad f(4) \quad f(5)$$

12

$$y = \frac{a}{b}x + c$$

$$y = \frac{d}{e}x + c$$

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

The equations of two perpendicular lines in the xy -plane are shown above, where a, b, c, d , and e are constants. If $0 < \frac{a}{b} < 1$, which of the following must be true?

- ☒ A) $\frac{d}{e} < -1$
- B) $-1 < \frac{d}{e} < 0$
- C) $0 < \frac{d}{e} < 1$
- D) $\frac{d}{e} > 1$

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Interpreting Linear Models

On the SAT, you will encounter linear model questions that are a direct extension of the previous chapter about lines. You'll have to interpret the meaning of the numbers in these models within a real world context, applying your understanding of slope and y -intercept to do so.

EXAMPLE 1: The value V , in dollars, of a home from 2006 to 2015 can be estimated by the equation $V = 240,000 - 5,000T$, where T is the number of years since 2006.

PART 1: Which of the following best describes the meaning of the number 240,000 in the equation?

- A) The value of the home in 2006
- B) The value of the home in 2015
- C) The average value of the home from 2006 to 2015
- D) The increase in the value of the home from 2006 to 2015

PART 2: Which of the following best describes the meaning of the number 5,000 in the equation?

- A) The number of homes sold each year
- B) The yearly decrease in the value of the home
- C) The difference between the value of the home in 2006 and in 2015
- D) The yearly decrease in the value of the home per square foot

Part 1 Solution: Many of these questions will give you an equation in $y = mx + b$ form. The y -intercept b will typically designate an initial value, the value when $x = 0$. In this case, the y -intercept is 240,000 and it describes the value of the home when $T = 0$, zero years after 2006, which, of course, is 2006. Answer **(A)**.

Part 2 Solution: Again, we're dealing with an equation of the form $y = mx + b$. The slope m always designates a rate, the increase or decrease in y for each increase in x . In this case, the slope is $-5,000$, which means the value of the home decreases by 5,000 for each year that goes by. Answer **(B)**.