Section 3.1 Slope of a Line and Applications of Slope

1. What is the slope of the line shown in the graph below?

   ![Graph of a line](image)

   (a) 3
   (b) −3
   (c) \( \frac{1}{3} \)
   (d) \( -\frac{1}{3} \)
   (e) This line has no slope.

2. What is the slope of the line that passes through the points (0, 2) and \((-2, -4)\)?

   (a) 1
   (b) −1
   (c) \( \frac{1}{3} \)
   (d) 3
   (e) Undefined

3. What is the slope of this line?

   (a) \( \frac{1}{2} \)
   (b) 2
4. Calculate the slope of the line through the points $(4, -3)$ and $(1, 3)$.
   (a) $2$
   (b) $-2$
   (c) $\frac{1}{2}$
   (d) $-\frac{1}{2}$

5. Calculate the slope of the line through the points $(6, -8)$ and $(6, 2)$.
   (a) $10$
   (b) $\frac{1}{10}$
   (c) $0$
   (d) undefined

6. True or False: All vertical lines have slope 0.
   (a) True, and I am very confident
   (b) True, but I am not very confident
   (c) False, but I am not very confident
   (d) False, and I am very confident
7. What does this line look like $2x + 1 = 7$?

(a) horizontal  

(b) vertical  

(c) up and to the right  

(d) down and to the right  

8. Which of the following functions represents a linear function with slope 3 and $y$-intercept $-4$?

(a) $y = -4x + 3$  
(b) $y = 3x - 4$  
(c) $y - 2 = 3(x - 2)$  
(d) Both (a) and (b)  
(e) Both (b) and (c)  

9. Which equation describes the linear function that has slope 3 and $x$-intercept 4?

(a) $y = 3x + 4$  
(b) $y = 4x + 3$  
(c) $y = 3x - 12$  
(d) $y = 3x + 12$  

10. The relationship between the latitude $L$ of a city in the Northern Hemisphere and its average annual temperature $T$ is modeled by the function $T = -0.68L + 89.5$. The slope of this linear function means

(a) That temperature at the equator would be 89.5°.  
(b) For every degree increase in latitude the average annual temperature increases by 89.5°.  
(c) For every degree increase in latitude the average annual temperature increases by 0.68°.  
(d) For every degree increase in latitude the average annual temperature decreases by 0.68°.
11. The relationship between the latitude $L$ of a city in the Northern Hemisphere and its average annual temperature $T$ is modeled by the function $T = -0.68L + 89.5$. The vertical intercept of this linear function means

(a) That temperature at the equator would be 89.5°.
(b) For every degree increase in latitude the average annual temperature increases by 89.5°.
(c) That temperature at the equator would be $-0.68°$.
(d) For every degree increase in latitude the average annual temperature decreases by $0.68°$.

12. Which equation describes a line that is parallel to the graph of $y = -2x + 4$?

(a) $y = \frac{1}{2}x - 3$
(b) $y = 2x - 3$
(c) $y = \frac{1}{2}x + 4$
(d) $y = -\frac{1}{2}x - 3$
(e) $y = -2x - 3$

13. Are the given lines parallel, perpendicular, or neither?

Line 1: $2x + 4y = 12$
Line 2: $2x - x = 4$

(a) parallel
(b) perpendicular
(c) neither

14. Which equation describes a line that is perpendicular to the graph of $y = -2x + 4$?

(a) $y = -\frac{1}{2}x - 3$
(b) $y = 2x - 3$
(c) $y = -\frac{1}{2}x + 4$
(d) $y = \frac{1}{2}x - 3$
(e) $y = -2x - 3$

15. Find the equation of the line that passes through the point $(1, 4)$ and is perpendicular to the line given by $3x - 2y = 6$. 

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(a) $y = \frac{3}{2}x + \frac{5}{2}$

(b) $y = \frac{3}{2}x - \frac{11}{2}$

(c) $y = -\frac{2}{3}x + \frac{14}{3}$

(d) $y = -\frac{2}{3}x - \frac{10}{3}$