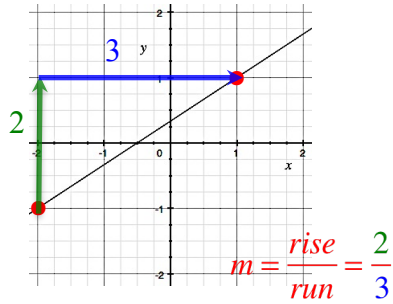


3.2 Geometric Characteristics of Lines

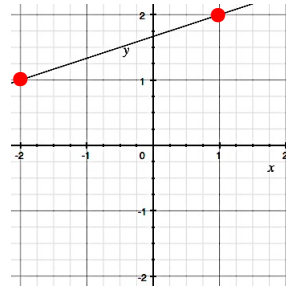
Solutions

Determine the slope of each line.

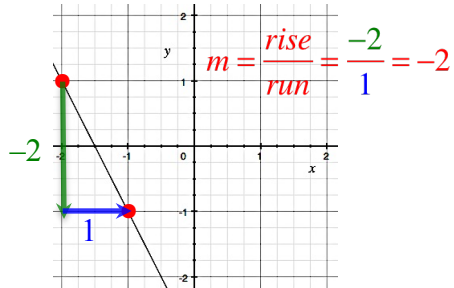
1.



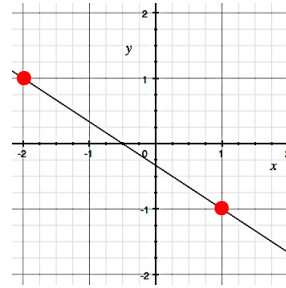
2.



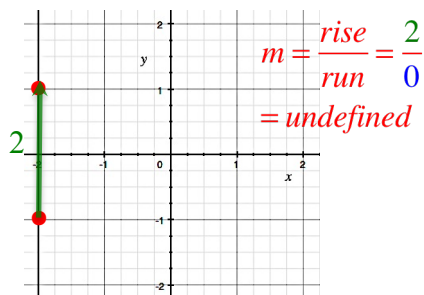
3.



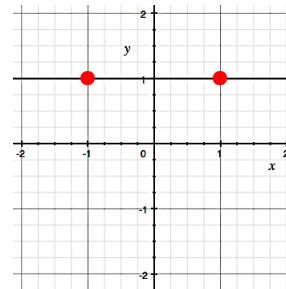
4.



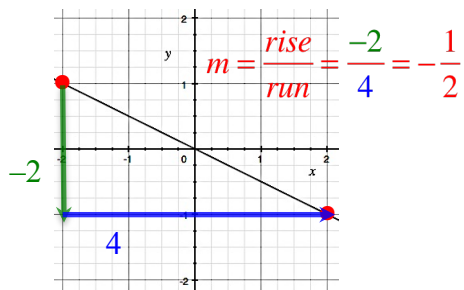
5.



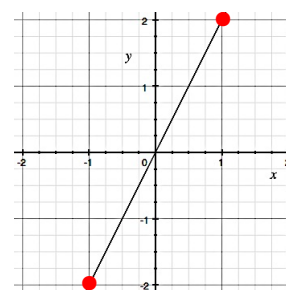
6.



7.



8.



Answers: 1. $\frac{2}{3}$; 3. -2 ; 5. undefined; 7. $-\frac{1}{2}$

Determine the slope of the line that passes through each pair of points.	
9. (3, 4) and (5, 9) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{9 - 4}{5 - 3} = \frac{5}{2}$	10. (0, 4) and (3, 8)
11. (2, -1) and (5, -1) $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - (-1)}{5 - 2} = \frac{0}{3} = 0$	12. (3, 4) and (3, -9)
Determine the slope and the y-intercept of each equation.	
13. $y = \frac{2}{3}x + 5$ $y = mx + b$ $m = \frac{2}{3}$ and $b = 5$	14. $y = -5x + 2$
15. $2x + 6y = 12$ $2x + 6y = 0x + 12$ $\underline{-2x}$ $\underline{-2x}$ $6y = -2x + 12$ $y = -\frac{2}{6}x + 2$ $m = -\frac{1}{3}$ and $b = 2$	16. $4x + 3y = 6$
17. $\frac{6y}{6} = \frac{12x}{6}$ $y = 2x + 0$ $m = 2$ and $b = 0$	18. $y = -8x$
19. $y = 15$ $y = 0x + 15$ $m = 0$ and $b = 15$	20. $y = -2$
Answers: 9. $m = \frac{5}{2}$; 11. $m = 0$; 13. $m = \frac{2}{3}$, $b = 5$; 15. $m = -\frac{1}{3}$, $b = 2$; 17. $m = 2$, $b = 0$; 19. $m = 0$, $b = 15$	

Write an equation of the line with the given slope, m and y -intercept, b . Write it in slope-intercept form, $y = mx + b$.	
21. $m = -5$ and $b = 10$ $y = mx + b$ $y = -5x + 10$	22. $m = 3$ and $b = -1$
23. $m = \frac{5}{6}$ and $b = -2$ $y = mx + b$ $y = \frac{5}{6}x - 2$	24. $m = -\frac{1}{4}$ and $b = 5$
25. $m = 0$ and $b = 8$ $y = mx + b$ $y = 0x + 8$ $y = 8$	26. $m = 0$ and $b = -6$
27. $m = \frac{1}{7}$ and $b = 0$ $y = mx + b$ $y = \frac{1}{7}x + 0$ $y = \frac{1}{7}x$	28. $m = -\frac{3}{4}$ and $b = 0$
Determine whether the following pairs of lines are parallel, perpendicular, or neither.	
29. $y = -5x + 1$ and $y = \frac{1}{5}x + 12$ $m_{\perp} = -\frac{1}{m}$ $m = -5, m_{\perp} = -\frac{1}{-5} = \frac{1}{5}$ Slopes are negative reciprocals to each other. perpendicular	30. $y = \frac{1}{2}x + 5$ and $y = -2x - 2$
31. $y = -3x - 10$ and $y = 3x + 2$ $m_{\perp} = -\frac{1}{m}$ $m = -3, m_{\perp} = -\frac{1}{-3} = \frac{1}{3}$ Slopes are not negative reciprocals to each other. neither	32. $y = 4x - 5$ and $y = -4x - 4$
33. $y = 2x$ and $y = 2x + 12$ Slopes are the same. parallel	34. $y = -3x - 4$ and $y = -3x$
35. $y = 15$ and $x = 12$ $y = 15$ is a horizontal line $x = 12$ is a vertical line perpendicular	36. $x = -5$ and $y = 1$
Answers: 21. $y = -5x + 10$; 23. $y = \frac{5}{6}x - 2$; 25. $y = 8$; 27. $y = \frac{1}{7}x$; 29. perpendicular; 31. neither; 31. parallel; 35. perpendicular	

Write the equation of the line in slope-intercept form, $y = mx + b$ that has the following characteristics:	
<p>37. slope is -3 and passes through the point $(5, 6)$</p> $y - y_1 = m(x - x_1)$ $y - 6 = -3(x - 5)$ $y - 6 = -3x + 15$ $\quad \underline{+6} \quad \quad \underline{+6}$ $y = -3x + 21$	<p>38. slope is 4 and passes through the point $(-1, 2)$</p>
<p>39. passes through the points $(-3, 1)$ and $(6, 4)$</p> $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 1}{6 - (-3)} = \frac{3}{9} = \frac{1}{3}$ $y - y_1 = m(x - x_1)$ $y - 1 = \frac{1}{3}(x - (-3))$ $y - 1 = \frac{1}{3}x + \frac{1}{3} \cdot 3$ $y - 1 = \frac{1}{3}x + 1$ $\quad \quad \underline{+1} \quad \quad \underline{+1}$ $y = \frac{1}{3}x + 2$	<p>40. passes through the points $(-1, 3)$ and $(2, -3)$</p>
<p>41. passes through $(2, 4)$ and is parallel to $y = \frac{1}{2}x - 1$.</p> $m = \frac{1}{2}$ $y - y_1 = m(x - x_1)$ $y - 4 = \frac{1}{2}(x - 2)$ $y - 4 = \frac{1}{2}x - \frac{1}{2} \cdot 2$ $y - 4 = \frac{1}{2}x - 1$ $\quad \quad \underline{+4} \quad \quad \underline{+4}$ $y = \frac{1}{2}x + 3$	<p>42. passes through $(2, 3)$ and is parallel to $y = 3x - 9$.</p>
<p>43. passes through $(1, 2)$ and is perpendicular to $y = \frac{1}{2}x - 1$.</p> $m = -2$ $y - y_1 = m(x - x_1)$ $y - 2 = -2(x - 1)$ $y - 2 = -2x + 2$ $\quad \underline{+2} \quad \quad \underline{+2}$ $y = -2x + 4$	<p>44. passes through $(3, -2)$ and is perpendicular to $y = 3x - 9$.</p>
<p>Answers: 37. $y = -3x + 21$; 39. $y = \frac{1}{3}x + 2$; 41. $y = \frac{1}{2}x + 3$; 43. $y = -2x + 4$</p>	