

Part I. Recall the following.

1. A vertical line is parallel to a VERTICAL line and perpendicular to a HORIZONTAL line.
2. A horizontal line is parallel to a HORIZONTAL line and perpendicular to a VERTICAL line.
3. Slopes of parallel lines are EQUAL.
4. Slopes of perpendicular lines are OPPOSITE RECIPROCALS.
5. Write the Point-Slope Form of a Line:  $y - y_1 = m(x - x_1)$
6. Write the y-intercept form of a line:  $y = mx + b$
7. Write the General Form of a Line:  $Ax + By = C$
8. Write the Form of a Horizontal Line:  $y = b$
9. Write the Form of a Vertical Line:  $x = a$
10. What letter in the point-slope form and y-intercept represents slope?  $m$
11. Write the formula you will use to find slope when you are given two points:  $m = \frac{y_2 - y_1}{x_2 - x_1}$

Part II. Find the slope of the line.

12.  $(0, 0); (4, 2)$

$$\frac{2-0}{4-0} = \frac{2}{4} = \frac{1}{2}$$

13.  $(1, -1); (-2, 3)$

$$\frac{3-(-1)}{-2-1} = \frac{4}{-3}$$

14.  $(4, -4); (2, 4)$

$$\frac{4-(-4)}{2-4} = \frac{8}{-2} = -4$$

Part III. Find the slope and the y-intercept.

15.  $3x + 4y = 6$

$$m = -\frac{3}{4} \quad b = \frac{6}{4} = \frac{3}{2}$$

16.  $4x - y = 10$

$$m = \frac{-4}{-1} = 4$$

$$b = \frac{10}{-1} = -10$$

17.  $x + 2y = 10$

$$m = -\frac{1}{2}$$

$$b = \frac{10}{2} = 5$$

Part IV. Find the slope of a line parallel to the given line and the slope of a line perpendicular to the given line.

18. Given line:  $y = 3x$

Parallel Slope: 3  
Perpendicular Slope:  $-\frac{1}{3}$

19. Given line:  $x + y = 3$

Parallel Slope: -1  
Perpendicular Slope: 1

20. Given line:  $4x + y = -2$

Parallel Slope: -4  
Perpendicular Slope:  $\frac{1}{4}$

21. Given line:  $y = -11$

Parallel Slope: 0  
Perpendicular Slope: UND

22. Given line:  $x = 5$

Parallel Slope:  $\frac{UND}{0}$   
 Perpendicular Slope:  $\frac{0}{UND}$

Part V. Find the equation of the line having the given characteristics. Express your answer in General Form.

23.  $m = -\frac{1}{3}$

containing the point (3, -4)

$$\begin{aligned} y - (-4) &= -\frac{1}{3}(x - 3) \\ 3(y + 4) &= -\frac{1}{3}x + 1 \\ 3y + 12 &= -x + 3 \\ x + 3y &= -9 \end{aligned}$$

25. containing the points (8, -1) and (4, 3)

$$\begin{aligned} \frac{3 - (-1)}{4 - 8} &= \frac{4}{-4} = -1 \quad x + y = 7 \\ y - 3 &= -1(x - 4) \\ y - 3 &= -x + 4 \end{aligned}$$

27. Parallel to the line  $2x - 3y = 4$ ; containing the point (-5, 3)

$$\begin{aligned} m &= \frac{2}{3} \\ y - 3 &= \frac{2}{3}(x + 5) \\ 3(y - 3) &= \frac{2}{3}x + \frac{10}{3} \\ 3y - 9 &= 2x + 10 \\ 2x - 3y &= -19 \end{aligned}$$

29. Parallel to the line  $x + y = 2$ ; containing the point (1, -3)

$$\begin{aligned} m &= -1 \\ y + 3 &= -1(x - 1) \\ y + 3 &= -x + 1 \\ x + y &= -2 \end{aligned}$$

31. Perpendicular to the line  $3x - y = -4$ ; containing the point (-2, 4)

$$\begin{aligned} m &= \frac{-3}{-1} = 3 \\ \perp m &= -\frac{1}{3} \\ y - 4 &= -\frac{1}{3}(x + 2) \\ 3(y - 4) &= -\frac{1}{3}x - \frac{2}{3} \\ 3y - 12 &= -x - 2 \\ x + 3y &= 10 \end{aligned}$$

24. slope is undefined;

containing the point (-2, 8)

$$x = -2$$

26. x-intercept -2; y-intercept 4 (-2, 0) (0, 4)

$$\begin{aligned} -1\left(\frac{x}{-2} + \frac{y}{4} = 1\right) \quad \frac{4-0}{0-2} &= \frac{y}{2} - 2 \\ 2x - y &= -4 \\ y - 4 &= 2(x - 0) \\ y - 4 &= 2x \\ 2x - y &= -4 \end{aligned}$$

28. horizontal through (-6, 5)

$$m = 0 \quad y = 5$$

30. Perpendicular to the line  $x + y = 2$ ; containing the point (4, -3)

$$\begin{aligned} m &= -\frac{1}{1} \\ \perp m &= 1 \\ y + 3 &= 1(x - 4) \\ x - y &= 7 \end{aligned}$$

32. Perpendicular to the line  $y = -2$ ; containing the point (-10, 18)

$$\begin{aligned} m &= 0 \\ \perp m &= \text{undefined} \\ x &= -10 \end{aligned}$$