

5-6 Practice Form G

→ same slopes

Write an equation of the line that passes through the given point and is PARALLEL to the graph of the given equation.

1. $(3, 2); y = 3x - 2$ $m = 3$

$$y = mx + b$$

$$2 = (3)(3) + b$$

$$2 = 9 + b$$

$$-7 = b$$

$$y = 3x - 7$$

2. $(-4, -1); y = 2x + 14$ $m = 2$

$$y = mx + b$$

$$-1 = (2)(-4) + b$$

$$-1 = -8 + b$$

$$7 = b$$

$$y = 2x + 7$$

3. $(-8, 6); y = -\frac{1}{4}x + 5$ $m = -\frac{1}{4}$

$$y = mx + b$$

$$6 = (-\frac{1}{4})(-8) + b$$

$$6 = 2 + b$$

$$4 = b$$

$$y = -\frac{1}{4}x + 4$$

4. $(6, 2); y = \frac{2}{3}x + 19$ $m = \frac{2}{3}$

$$y = mx + b$$

$$2 = (\frac{2}{3})(6) + b$$

$$2 = 4 + b$$

$$-2 = b$$

$$y = \frac{2}{3}x - 2$$

5. $(10, -5); y = \frac{3}{2}x - 7$ $m = \frac{3}{2}$

$$y = mx + b$$

$$-5 = (\frac{3}{2})(10) + b$$

$$-5 = 15 + b$$

$$-20 = b$$

$$y = \frac{3}{2}x - 20$$

6. $(-3, 4); y = 2$ $m = 0$

$$y = mx + b$$

$$4 = 0(-3) + b$$

$$4 = b$$

$$y = 4$$

parallel \Rightarrow same slopes

Determine whether the graphs of the given equations are parallel, perpendicular, or neither. Explain.

7. $y = 4x + 5 \rightarrow y = 4x + 5; m = 4$

$-4x + y = -13 \rightarrow y = 4x - 13; m = 4$

Parallel lines

8. $y = \frac{7}{9}x - 7$ $m = \frac{7}{9}$

$y = -\frac{7}{9}x + 3$ $m = -\frac{7}{9}$

Neither

9. $y = \frac{7}{8}$ $m = 0$
 $x = -4$ $m = \text{undefined}$

Perpendicular

10. $y = -6x - 8$ $m = -6$

$-x + 6y = 12$

$\frac{6y}{6} = \frac{x}{6} + \frac{12}{6}$
 $y = \frac{1}{6}x + 2$ $m = \frac{1}{6}$

Perpendicular

$$\begin{aligned}
 & \rightarrow 3x + 6y = 12 \\
 & \frac{6y}{6} = \frac{-3x + 12}{6} \\
 & y = -\frac{1}{2}x + 2 \\
 & m = -\frac{1}{2} \\
 & \boxed{\text{Parallel}} \\
 & m = -\frac{1}{2}
 \end{aligned}$$

$$\begin{aligned}
 12. \quad y &= 4x + 12 \quad ; \quad m = 4 \\
 x + 4y &= 32 \\
 \frac{4y}{4} &= \frac{-x + 32}{4} \\
 y &= -\frac{1}{4}x + 8 \\
 m &= -\frac{1}{4} \\
 & \boxed{\text{Perpendicular}}
 \end{aligned}$$

Write an equation of the line that passes through the given point and is **PERPENDICULAR** to the graph of the given equation.

I switch between slope-intercept & point slope to practice each type.

↳ opposite / reciprocal slopes

$$\begin{aligned}
 13. \quad (2, -1); \quad y &= -2x + 1 \quad m_{\perp} = \frac{1}{2} \\
 y &= mx + b \\
 -1 &= \frac{1}{2}(2) + b \\
 -1 &= 1 + b \\
 -2 &= b \\
 & \boxed{y = \frac{1}{2}x - 2}
 \end{aligned}$$

$$\begin{aligned}
 14. \quad (5, 7); \quad y &= \frac{1}{3}x + 2 \quad m_{\perp} = -3 \\
 y - y_1 &= m(x - x_1) \\
 y - 7 &= -3(x - 5) \\
 y - 7 &= -3x + 15 \\
 & \boxed{y = -3x + 22}
 \end{aligned}$$

$$\begin{aligned}
 15. \quad (3, -6); \quad x + y &= -4 \\
 y &= -x - 4; \quad m_{\perp} = 1 \\
 y &= mx + b \\
 -6 &= 1(3) + b \\
 -6 &= 3 + b \\
 -9 &= b \\
 & \boxed{y = 1x - 9}
 \end{aligned}$$

$$\begin{aligned}
 16. \quad (-9, 3); \quad 3x + y &= 5 \\
 x, y_1 \quad y &= -3x + 5; \quad m_{\perp} = \frac{1}{3} \\
 y - y_1 &= m(x - x_1) \\
 y - 3 &= \frac{1}{3}(x - (-9)) \\
 y - 3 &= \frac{1}{3}x + 3 \\
 & \boxed{y = \frac{1}{3}x + 6}
 \end{aligned}$$

$$\begin{aligned}
 17. \quad (-8, 3); \quad y + 4 &= -\frac{2}{3}(x - 2); \quad m_{\perp} = \frac{3}{2} \\
 y &= mx + b \\
 3 &= \frac{3}{2}(-8) + b \\
 3 &= -12 + b \\
 15 &= b \\
 & \boxed{y = \frac{3}{2}x + 15}
 \end{aligned}$$

$$\begin{aligned}
 18. \quad (0, -5); \quad x - 6y &= -2 \\
 x, y \quad -6y &= -x - 2 \\
 \uparrow \quad -6 \quad -6 \quad -6 \\
 y - \text{int} \quad y &= \frac{1}{6}x + \frac{1}{3} \\
 b = -5 \quad m_{\perp} &= -6 \\
 y &= mx + b \\
 y &= -6x - 5
 \end{aligned}$$

19. What is the slope of a line that is parallel to the x-axis?

$$\longleftrightarrow \quad m = 0$$

20. What is the slope of a line that is perpendicular to the x-axis?

$$\updownarrow \quad m = \text{undefined}$$

21. What is the slope of a line that is parallel to the y-axis?

$$\updownarrow \quad m = \text{undefined}$$

22. What is the slope of a line that is perpendicular to the y-axis?

$$\longleftrightarrow \quad m = 0$$