Parallel and Perpendicular Lines Worksheet

KEY (work on back)

Write the equation in slope intercept form of the line parallel and line perpendicular to given line through given point.

		Parallel	Perpendicular
1) $y = 4x + 7$	$(-2, -9)$	$y = 4x - 1$	$y = -\frac{1}{4}x - 9\frac{1}{2}$
2) $2x - 5y = 10$	$(3, -7)$	$y = \frac{2}{5}x - 8\frac{1}{5}$	$y = -\frac{5}{2}x + \frac{1}{2}$
3) $3x + 4y = 16$	$(12, -5)$	$y = -\frac{3}{4}x + 4$ Same line!	$y = \frac{4}{3}x - 21$

Write the equation of a line (a) parallel to $\overline{AB}$ and (b) perpendicular to $\overline{AB}$.

① calculate slope.
② pick any "b" value

4) A $(3, -6)$ B $(7, 2)$ (x_1, y_1 x_2, y_2)

$m = \frac{-6-2}{3-7} = \frac{-8}{-4} = 2$

$m = \frac{2-(-6)}{7-3} = \frac{8}{4} = 2$

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

5) A $(2, 5)$ B $(6, -7)$ (x_1, y_1 x_2, y_2)

$m = \frac{5+(+7)}{2-6} = \frac{12}{-4} = -3$

$m = \frac{-7-5}{6-2} = \frac{-12}{4} = -3$

(a) $y = -3x - 5$
(b) $y = \frac{1}{3}x + 4$

6) A $(8, 1)$ B $(0, -1)$ (x_1, y_1 x_2, y_2)

$m = \frac{1+(+1)}{8-0} = \frac{2}{8} = \frac{1}{4}$

$m = \frac{-1-1}{0-8} = \frac{-2}{-8} = \frac{1}{4}$

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

7) A $(7, 9)$ B $(1, 5)$ (x_1, y_1 x_2, y_2)

$m = \frac{9-5}{7-1} = \frac{4}{6} = \frac{2}{3}$

$m = \frac{5-9}{1-7} = \frac{-4}{-6} = \frac{2}{3}$

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

State if the lines are Parallel, Perpendicular, or Neither.

* get both in slope-int form ($y = mx + b$)
* compare slopes.

8) $6x - 12y = 24$ and $4x + 2y = 8$

Perpendicular

$6x - 12y = 24$; $-6x \quad -6x$

$\frac{-12y}{-12} = \frac{-6x}{-12} + \frac{24}{-12}$

$y = \frac{1}{2}x - 2$

$4x + 2y = 8$; $-4x \quad -4x$

$\frac{2y}{2} = \frac{-4x}{2} + \frac{8}{2}$

$y = -2x + 4$

9) $4x + y = 5$ and $3x + 12y = -6$

Neither

$4x + y = 5$; $-4x \quad -4x$

$y = -4x + 5$

$3x + 12y = -6$; $-3x \quad -3x$

$\frac{12y}{12} = \frac{-3x}{12} - \frac{6}{12}$

$y = -\frac{1}{4}x - \frac{1}{2}$

10) $-2x + 7y = 14$ and $4x = 14y$

Neither

$-2x + 7y = 14$; $+2x \quad +2x$

$\frac{7y}{7} = \frac{2x}{7} + \frac{14}{7}$

$y = \frac{2}{7}x + 2$

$\frac{14y}{14} = \frac{4x}{14}$

$y = \frac{4}{14}x$

$y = \frac{1}{2}x$

① $y = 4x + 7$ $(-2, -9)$ (x, y)

Parallel

$-9 = 4(-2) + b$

$-9 = -8 + b$

$+8 \quad +8$

$-1 = b$

$\boxed{y = 4x - 1}$

perpendicular

$-9 = -\frac{1}{4}(-2) + b$

$-9 = \frac{1}{2} + b$

$-\frac{1}{2} \quad -\frac{1}{2}$

$-9\frac{1}{2} = b$

$\boxed{y = -\frac{1}{4}x - 9\frac{1}{2}}$

② $2x - 5y = 10$ $(3, -7)$ (x, y)

$-2x \quad -2x$

$\frac{-5y}{-5} = \frac{-2x}{-5} + \frac{10}{-5}$

$y = \frac{2}{5}x - 2$

parallel

$-7 = \frac{2}{5}(3) + b$

$-7 = \frac{6}{5} + b$

$-7 = 1\frac{1}{5} + b$

$-1\frac{1}{5} \quad -1\frac{1}{5}$

$-8\frac{1}{5} = b$

$\boxed{y = \frac{2}{5}x - 8\frac{1}{5}}$

perpendicular

$-7 = -\frac{5}{2}(3) + b$

$-7 = -\frac{15}{2} + b$

$-7 = -7\frac{1}{2} + b$

$+7\frac{1}{2} \quad +7\frac{1}{2}$

$\frac{1}{2} = b$

$\boxed{y = -\frac{5}{2}x + \frac{1}{2}}$

③ $3x + 4y = 16$ $(12, -5)$ (x, y)

$-3x \quad -3x$

$\frac{4y}{4} = \frac{-3x}{4} + \frac{16}{4}$

$\boxed{y = -\frac{3}{4}x + 4}$

parallel

$-5 = -\frac{3}{4}(12) + b$ $\quad -\frac{36}{4}$

$-5 = -9 + b$

$+9 \quad +9$

$4 = b$

$\boxed{y = -\frac{3}{4}x + 4}$

Perpendicular

$-5 = \frac{4}{3}(12) + b$ $\quad \frac{48}{3}$

$-5 = 16 + b$

$-16 \quad -16$

$-21 = b$

$\boxed{y = \frac{4}{3}x - 21}$