

5 - 6

**Geometry: Parallel and
Perpendicular Lines**

parallel lines: lines in the same plane
that never intersect

** Parallel lines have same slope .

perpendicular lines: intersect to form
four right angles

**** Perpendicular lines' slopes are
opposite reciprocals.**

Ex: $-\frac{2}{3}$ and $\frac{3}{2}$ $m = \frac{0}{\#}$ $\frac{\#}{0}$

Ex: $\frac{4}{1}$ and $-\frac{1}{4}$

Ex: $-\frac{1}{1}$ and 1

Ex: Write the slope-intercept form of a line that passes through $(-1, -2)$ and is parallel to the line $y = -3x + 2$.

$$y - y_1 = m(x - x_1)$$

$$y + 2 = -3(x + 1)$$

$$y + \cancel{2} = -3x - \cancel{3}$$

$+2$ -2

$$y = -3x - 5$$

Ex: For the following four points, determine whether \overline{AC} and \overline{BD} are parallel, perpendicular, or neither.

$A(5, 5)$ $B(8, 4)$ $C(7, 1)$ $D(0, 0)$

$$m = \frac{y - y}{x - x}$$

4 and ~~-4~~

$$m_{\overline{AC}} = \frac{5 - 1}{5 - 7} = \frac{4}{-2} = -2$$

$$m_{\overline{BD}} = \frac{4 - 0}{8 - 0} = \frac{4}{8} = \frac{1}{2}$$

Ex: Write the slope-intercept form of a line that passes through $(-3, -2)$ and is perpendicular to the line $x + 4y = 12$.

$$\perp m = 4$$
$$y + 2 = 4(x + 3)$$

$$y + \underset{-2}{2} = 4x + \underset{-2}{12}$$

$$y = 4x + 10$$

$$\cancel{x} + 4y = -\cancel{x} + 12$$
$$\frac{4y}{4} = \frac{-x + 12}{4}$$

$$y = \underline{\underline{-\frac{1}{4}x + 3}}$$

**** A y-intercept of 4 is actually the point**
(0, 4) .

**** An x-intercept of 3 is actually the point**
(3, 0) .

Ex: Write the slope-intercept form of a line that is perpendicular to the line $y = -\frac{1}{3}x + 2$ and passes through the x-intercept of that line.

$$\perp m = 3$$
$$0 = -\frac{1}{3}x + 2$$
$$-2 = -\frac{1}{3}x$$
$$y - 0 = 3(x - 6)$$
$$y = 3x - 18$$
$$6 = x$$
$$(6, 0)$$

Homework:

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14, 20, 24, 30, 32, 36, 40

\perp perpendicular

\parallel parallel

$\overline{AB} \parallel \overline{CD}$