

## Section 5.3 Writing Linear Equations Given 2 Points

### Step 1: Find the slope.

$$\frac{y_2 - y_1}{x_2 - x_1} = m$$

Substitute the coordinates of the two given points into the formula for slope.

### Step 2: Find the y-intercept.

Substitute the slope  $m$  and the coordinates of the given point  $(x, y)$  into the slope-intercept form  $y = mx + b$ . Then solve for the y-intercept,  $b$ .

### Step 3: Write an equation of the line.

Substitute the slope  $m$  and the y-intercept  $b$  into the slope-intercept form,  $y = mx + b$ .

### Examples

1. Write an equation of the line that passes through the points  $(-3, 1)$  and  $(5, 6)$ .

$m$	$b$	$y = mx + b$
$\frac{6-1}{5-(-3)} = m$ $\frac{5}{8} = m$	$b = \frac{5}{8}(5) + b$ $b = \frac{25}{8} + b$ $-\frac{25}{8} \quad -\frac{25}{8}$ $\frac{13}{8} = b$	$y = \frac{5}{8}x + \frac{23}{8}$

2. Write an equation of the line that passes through the points  $(-5, 2)$  and  $(-3, 8)$ .

$m$	$b$	$y = mx + b$
$\frac{8-2}{-3+5} = m$ $\frac{6}{2} = m$ $3 = m$	$8 = 3(-3) + b$ $8 = -9 + b$ $+9 \quad +9$ $17 = b$	$y = 3x + 17$



Parallel lines have the same slope



\*\*\* Perpendicular lines have opposite reciprocal.

#	Opposite Reciprocal
-7	$\frac{1}{7}$
5	$-\frac{1}{5}$
0	und.
$-\frac{2}{3}$	$\frac{3}{2}$
$\frac{1}{9}$	-9

3. Write an equation of the line through (20, -5) perpendicular to  $y = -10x + 6$ .

$m = -10$   
\*  $\perp m = \frac{1}{10}$

$\perp m$	b	$y = mx + b$
$\frac{1}{10} = m$	$(20, -5)$ $-5 = \frac{1}{10}(20) + b$ $-5 = 2 + b$ $-7 = b$	$y = \frac{1}{10}x - 7$

4. A camp program charges a registration fee and daily amount. If the total bill for one camper was \$388 for 12 days and the total bill for another camper was \$506 for 17 days, how much will the bill be for a camper who enrolls for 30 days?

$x = \text{days}$   
 $y = \text{Total}$

$(12, 388)$   
 $(17, 506)$

m	b	$y = mx + b$
$m = \frac{506 - 388}{17 - 12}$ $m = \frac{118}{5} = 23.60$	$388 = 23.63(12) + b$ $388 = 283.20 + b$ $-283.20 - 283.20$ $\$104.80 = b$	$y = 23.60x + 104.80$

