

## Mpm 10 ws 5.8 parallel and

Find the equation of each of the following lines:

1. parallel to  $y = 3x + 6$  and through  $(-1, -5)$

Solution

$$\text{Slope} = 3.$$

$$(-1, -5) (x, y)$$

$$(x+1) \frac{y+5}{x+1} = 3(x+1)$$

$$y+5 = 3x+3.$$

$$\underline{\underline{y = 3x - 2.}}$$

2. perpendicular to  $y = -\frac{3}{4}x + 11$  and through  $(6, 8)$

$$\text{slope} = G_1 \times G_2 = -1.$$

$$-\frac{3}{4} \times G_2 = -1$$

$$G_2 = -1 \times \frac{4}{3}$$

$$G_2 = \frac{4}{3} (6, 8) (x, y)$$

$$(x-6) \frac{y-8}{x-6} = \frac{4}{3}(x-6)$$

$$y-8 = \frac{4}{3}x - 8$$

$$\cancel{y} = \frac{4}{3}x \quad \underline{\underline{y = \frac{4}{3}x}}$$

## perpendicular lines

3. parallel to  $2x + 3y - 6 = 0$   $(-5, 3)$

$$\frac{3y}{3} = -\frac{2x}{3} + \frac{6}{3}$$

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

$$\text{slope} = -\frac{2}{3} (-5, 3) (x, y)$$

$$(x+5) \frac{y-3}{x+5} = -\frac{2}{3}(x+5).$$

$$y-3 = -\frac{2}{3}x - \frac{10}{3}.$$

$$\underline{\underline{y = -\frac{2}{3}x - \frac{1}{3}.}}$$

4. Through  $(4, 5)$   $(3, -1)$  with a slope of  $\frac{1}{2}$ .

$$(3, -1) (x, y)$$

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

$$y+1 = \frac{1}{2}x - \frac{3}{2}.$$

$$\underline{\underline{y = \frac{1}{2}x - \frac{5}{2}.}}$$

- 5) slope 2 point  $(0, 6)$   $(x, y)$

$$(x-0) \frac{y-6}{x-0} = 2(x-0)$$

$$y-6 = 2x$$

$$\underline{\underline{y = 2x + 6}}$$

6. Through  $(4, 5)$  and  $(-1, -1)$

$$\text{Slope} = \frac{5+1}{4+1} = \frac{6}{5}$$

another point  $(x, y)$

$$(x+1) \frac{y+1}{x+1} = \frac{6}{5} (x+1)$$

$$y+1 = \frac{6}{5}x + \frac{6}{5}$$

$$\underline{\underline{y = \frac{6}{5}x + \frac{1}{5}}}$$

7. Through  $(-1, 3)$  parallel to the line  $2x + y = 3$ .

$$\text{Slope } y = -2x + 3$$

-2

$$(x+1) \frac{y-3}{x+1} = -2 \cdot (x+1)$$

$$y-3 = -2x-2$$

$$\underline{\underline{y = -2x + 1}}$$

8. perpendicular to  $2x - y = 3$ , and with a y-intercept of -2.

$$\text{slope } y = 2x + 3$$

$$\text{perpendicular } G_1 \times G_2 = -1$$

$$2 \times G_2 = -1$$

$$G_2 = -\frac{1}{2} \quad \left(\frac{1}{2}, -2\right) (x, y)$$

$$(x-\frac{1}{2}) \frac{y+2}{x-\frac{1}{2}} = -\frac{1}{2} (x-\frac{1}{2})$$

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

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

9. parallel to the line  $x - 2y + 3 = 0$  and passing through  $(3, 2)$ .

$$\text{Slope } \frac{-2y = -x + 3}{-2} = \frac{-x + 3}{-2}$$

$$y = \frac{1}{2}x - \frac{3}{2}$$

$$= \frac{1}{2} \cdot (3, 2) (x, y)$$

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

$$y-2 = \frac{1}{2}x - \frac{3}{2}$$

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

10. Through  $(4, -5)$  and with the same x-intercept as the line  $2x + y + 8 = 0$ .

$$y = -2x - 8$$

$$\text{x-intercept } 0 = -2x - 8$$

$$\frac{2x = -8}{2} \quad \frac{-8}{2}$$

$$x = -4$$

$$(4, -5) \quad (-4, 0)$$

$$\frac{0+5}{-4-4} = \frac{-5}{8}$$

$$\text{Slope} = \frac{-5}{8} \quad (-4, 0) (x, y)$$

$$(x+4) \frac{y-0}{x+4} = \frac{-5}{8} (x+4)$$

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

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