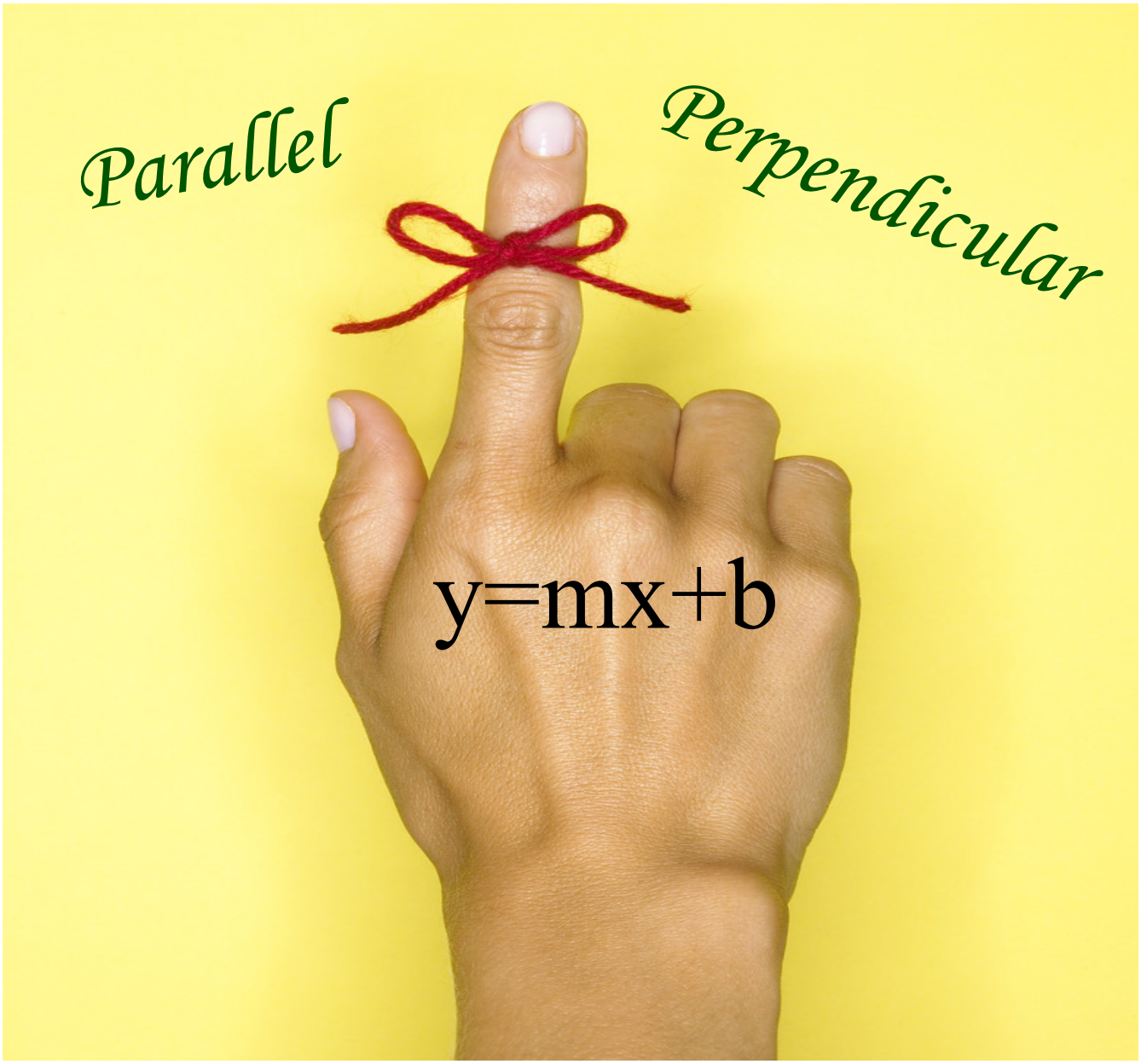
Parallel
Perpendicular
y=mx+b


Reminder !!!
Whenever you see the words Parallel & Perpendicular think
Slope


y-intercept
x=0
Reminder!
x-intercept
y=0

Warm Up Questions

#1 Find the equation of a line parallel to $3y=4x-1$ and passing through the point $(4,2)$.

#2 Determine the equation of a line perpendicular to $4x+5y=7$ and having the same x-intercept as $10x+7y=-20$.

#3 Determine the equation of a horizontal line passing through the same point on the y-axis as $3y = 6x - 9$

Find the equation of a line parallel to 3y=4x-1 and passing through the point (4,2).

Slope:

Point:

(x y):

Step #1

Parallel - (Same Slope)

$3y = 4x - 1$

Step #2

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

Determine the equation of a line perpendicular to 4x+5y=7 and having the same x-intercept as 10x+7y=-20.

slope: 5/4 $m = \frac{5}{4}$

point: (-2, 0) $x_1 = -2$ $y_1 = 0$

(x,y):

Step #1

Opposite Reciprocal Slope

$4x+5y=7$

$\frac{5y}{5} = \frac{-4x}{5} + \frac{7}{5}$

$y = \frac{-4}{5}x + \frac{7}{5}$

$y = mx + b$

$m = \frac{-4}{5}$

$m_{\perp} = \frac{5}{4}$

Step #2

Point x-int (y = 0)

$10x+7y=-20$

$10x+7(0)=-20$

$10x+0=-20$

$\frac{10x}{10} = \frac{-20}{10}$

$x = -2$

$(-2,0)$

Step #3

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

$y-0 = \frac{5}{4}(x-(-2))$

$y = \frac{5}{4}(x+2)$

4. $y = \frac{4 \cdot 5}{4}x + \frac{4 \cdot 10}{4}$ cp. 4

$4y = 5x + 10$

$0 = 5x - 4y + 10$

Determine the equation of a horizontal line passing through the same point on the y-axis as $3y = 6x - 9$ (y int ??)

slope: $m = \frac{0}{1}$

point: (0, -3) $x_1 = 0$ $y_1 = -3$

(x,y): (x, y)

Step #1

Horizontal Line

Slope = 0/1

Step #2

Point y-int (x=0)

$3y = 6x - 9$

$3y = 6(0) - 9$

$3y = 0 - 9$

$\frac{3y}{3} = \frac{-9}{3}$

$y = -3$

$(0, -3)$

Step #3

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

$y - -3 = \frac{0}{1}(x - 0)$

$y + 3 = 0(x)$

$y + 3 = 0$

$y = -3$

Homework:

① Given:

point: $(-2, 7)$ $x_1 = -2$ $y_1 = 7$

(i) Find Slope

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

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

$y = mx + b$

$m = 4$

$m_{\perp} = -\frac{1}{4}$

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

$y - 7 = 4(x - -2)$

$y - 7 = 4(x + 2)$

$y - 7 = 4x + 8$

$y = 4x + 8 + 7$

$\boxed{y = 4x + 15}$ slope intercept form

$\boxed{0 = 4x - y + 15}$ general form

③ Given:

x-int: $(3,0)$ $x_1 = 3$ $y_1 = 0$

y-int: $(0,-4)$ or $x_1 = 0$ $y_1 = -4$

(i) Find m:

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

$$m = \frac{-4-0}{0-3}$$

$$m = \frac{-4}{-3}$$

$$m = \frac{4}{3}$$

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

$$y - -4 = \frac{4}{3}(x-0)$$

$$y + 4 = \frac{4}{3}(x)$$

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

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

⑤ Given:

Point: $(4,-3)$ $x_1 = 4$ $y_1 = -3$

(i) Find Slope

$2(y-1) = 10x-4$

$2y-2 = 10x-4$

$2y = 10x-4+2$

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

$y = 5x-1$

$m = 5$

$m_{\perp} = 5$

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

$y - -3 = 5(x - 4)$

$y+3 = 5x-20$ -3

$y = 5x-23$

M(3, 5) U(-2, -1) D(0, -4)
Find the equation of a line parallel to MD and passing through U.

slope:

point:

(x,y):