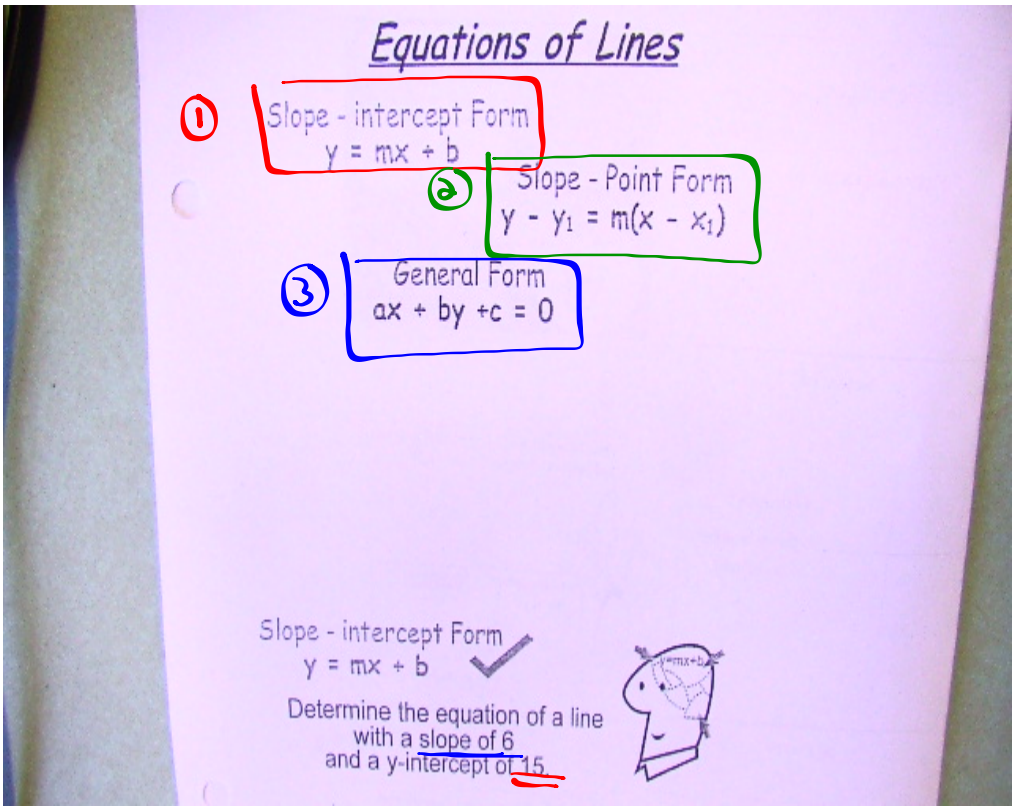
Equations of Lines

Kicking it up a notch!!



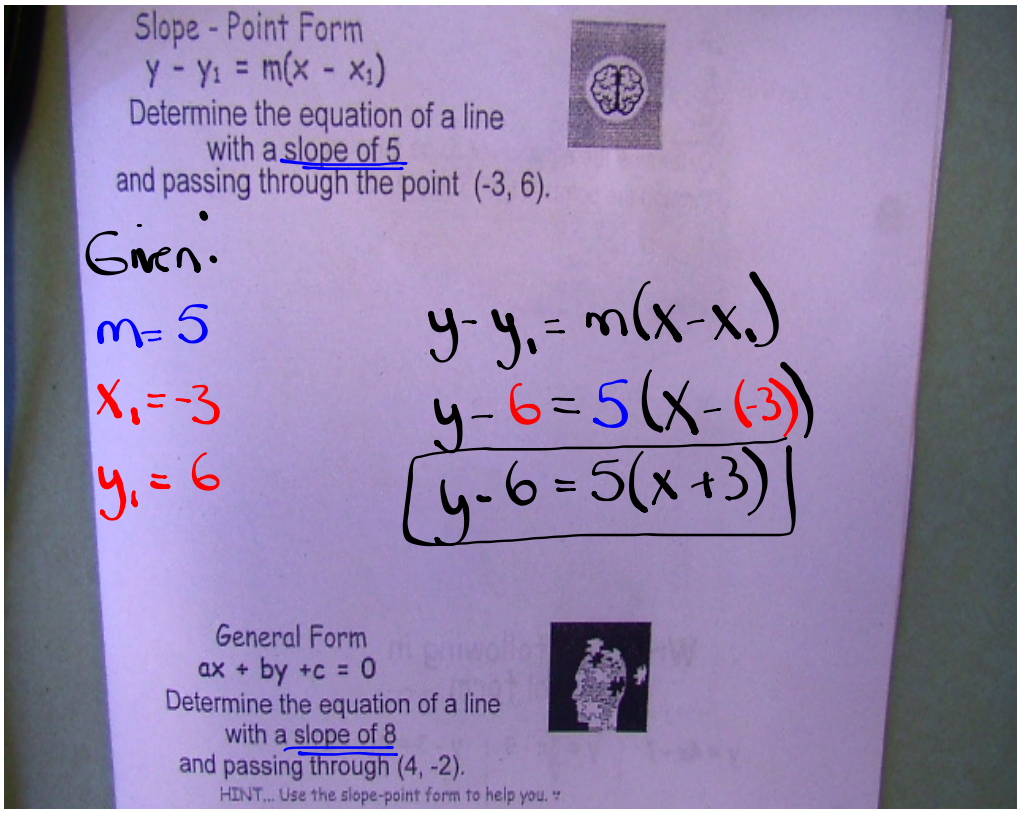
Given:

$m = 6$

$b = y\text{-int} = 15$

$y = mx + b$

$y = 6x + 15$



Given:

$m = 5$

$x_1 = -3$

$y_1 = 6$

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

$y - 6 = 5(x - (-3))$

$y - 6 = 5(x + 3)$

Given:

$m = 8$

$x_1 = 4$

$y_1 = -2$

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

$y - (-2) = 8(x - 4)$

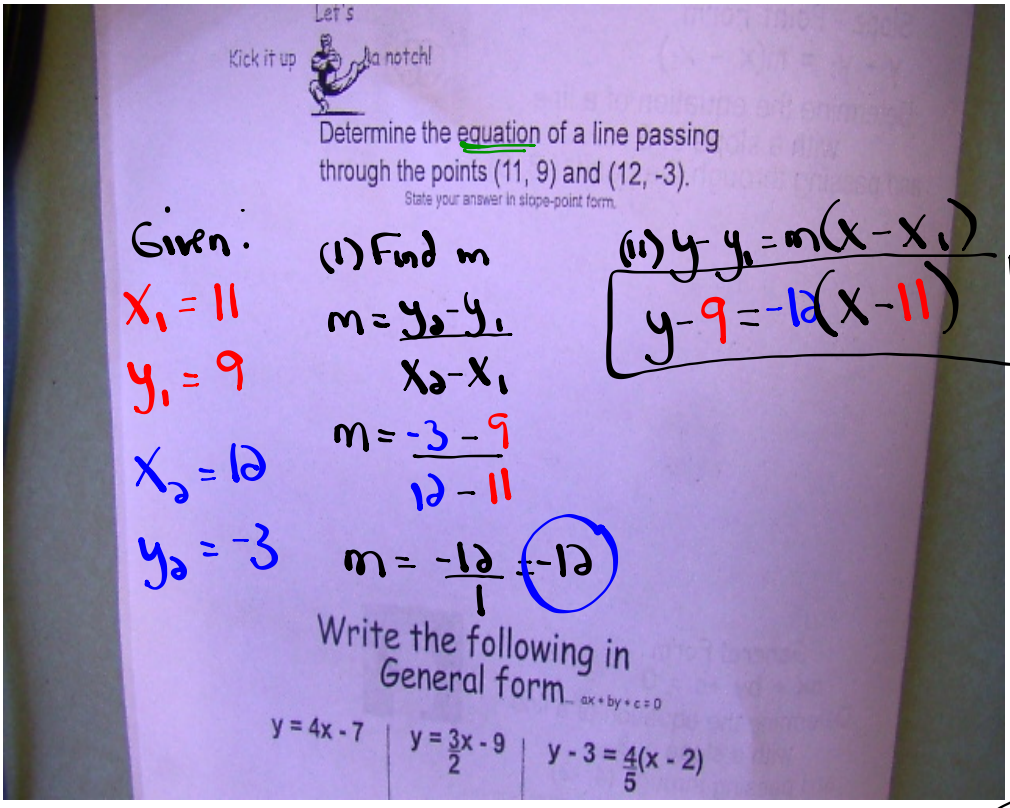
$y + 2 = 8(x - 4)$ Slope-Point Form

$y + 2 = 8x - 32$

$-8x + y + 2 + 32 = 0$

$-8x + y + 34 = 0$

$8x - y - 34 = 0$ General Form


Let's
Kick it up a notch!

Determine the equation of a line passing through the points (11, 9) and (12, -3).

State your answer in slope-point form.

Given:

$x_1 = 11$

$y_1 = 9$

$x_2 = 12$

$y_2 = -3$

(i) Find m

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

$m = \frac{-3 - 9}{12 - 11}$

$m = \frac{-12}{1} = -12$

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

$y - 9 = -12(x - 11)$

Write the following in General form $ax + by + c = 0$

$y = 4x - 7$ | $y = \frac{3}{2}x - 9$ | $y - 3 = \frac{4}{5}(x - 2)$

(i) $y = 4x - 7$

$0 = 4x - y - 7$

$4x - y - 7 = 0$

(ii) $2 \cdot y = 2 \cdot \frac{3}{2}x - 2 \cdot 9$

$2y = \frac{6x}{2} - 18$

$2y = 3x - 18$

$0 = 3x - 2y - 18$

$3x - 2y - 18 = 0$

(iii) $y - 3 = \frac{4}{5}(x - 2)$

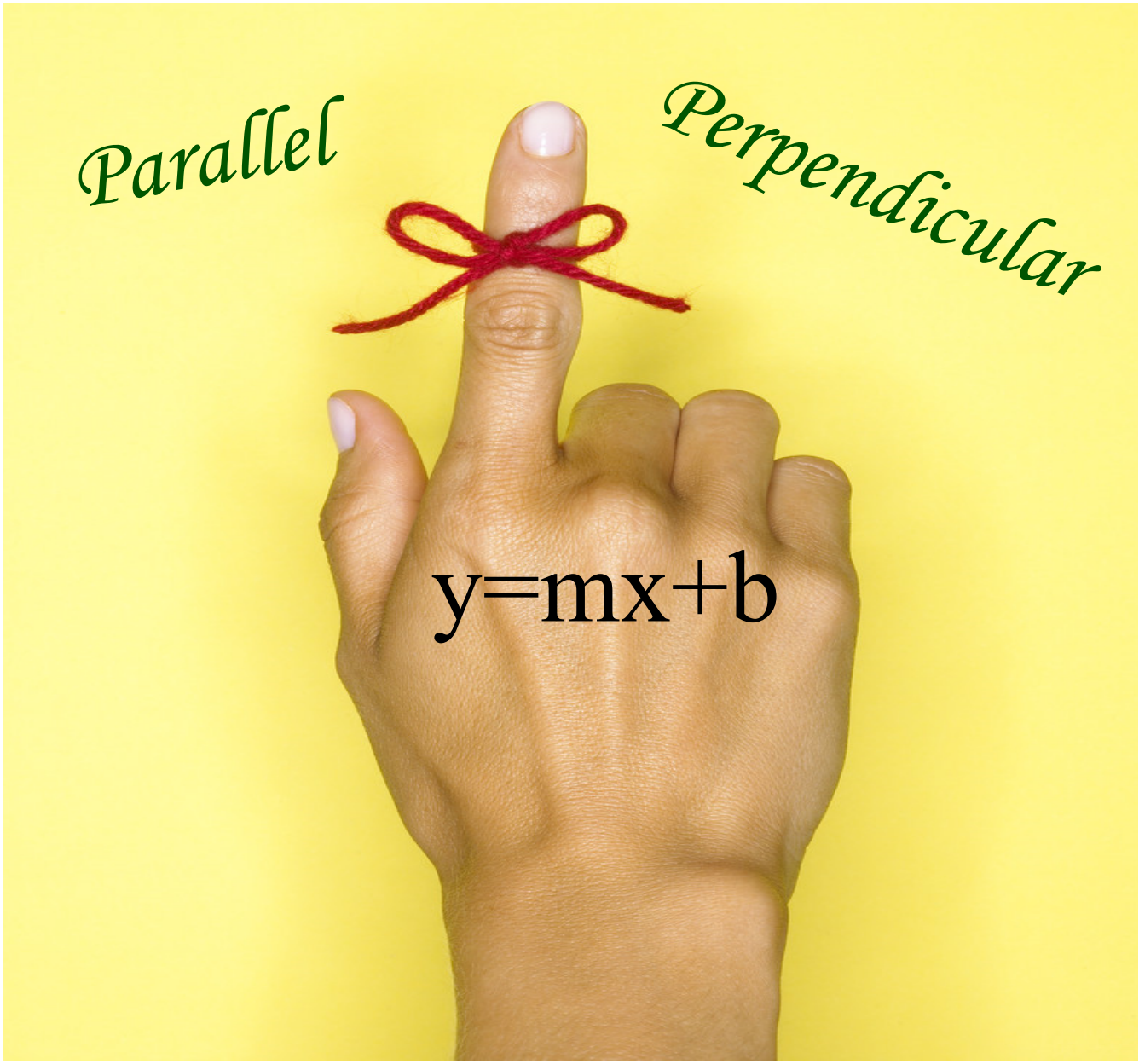
$5 \cdot y - 5 \cdot 3 = 5 \cdot \frac{4x}{5} - 5 \cdot \frac{8}{5}$

$5y - 15 = 4x - 8$

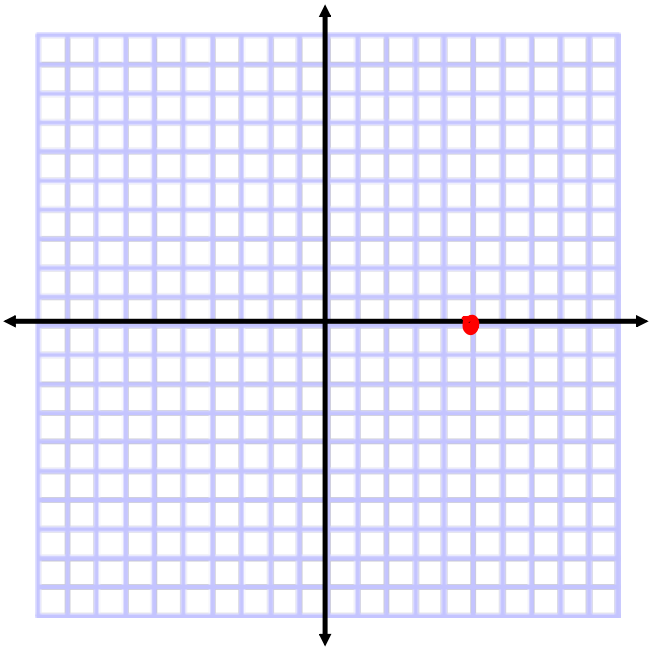
$0 = 4x - 5y - 8 + 15$

$0 = 4x - 5y + 7$

$4x - 5y + 7 = 0$


Parallel
Perpendicular
y=mx+b


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



x-intercept = 5

$(y=0)$

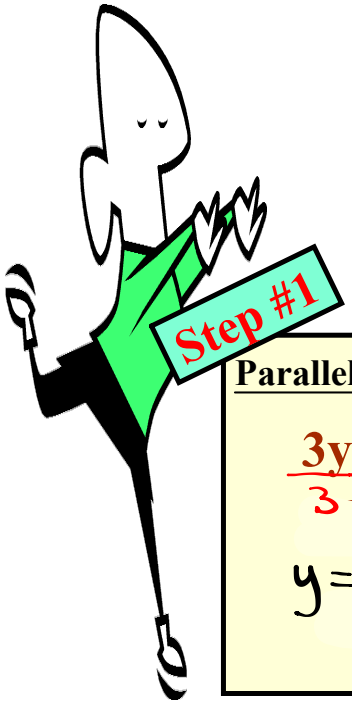
Do you know the co-ordinate?

$(5,0)$


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

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

$x_1 = 4$ $y_1 = 2$ $m = \frac{4}{3}$



Step #1

Parallel - (Same Slope)

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

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

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

$m_{\perp} = \frac{4}{3}$

Step #2

Write Equation in General Form

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

$y - 2 = \frac{4}{3}(x - 4)$

$3 \cdot y - 2 \cdot 3 = \frac{4x}{3} \cdot 3 - \frac{16}{3} \cdot 3$

$3y - 6 = 4x - 16$

$0 = 4x - 3y - 16 + 6$

$\boxed{0 = 4x - 3y - 10}$

Determine the equation of a line perpendicular to $4x+5y=7$ and having an x-intercept of -2.

$x_1 = -2$

$y_1 = 0$

Step #1

Opposite Reciprocal Slope

$4x+5y=7$

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

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

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

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

Step #2

Point x-int (y = 0)

Point (-2, 0)

$x_1 = -2$

$y_1 = 0$

Step #3

Write Equation in General Form

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

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

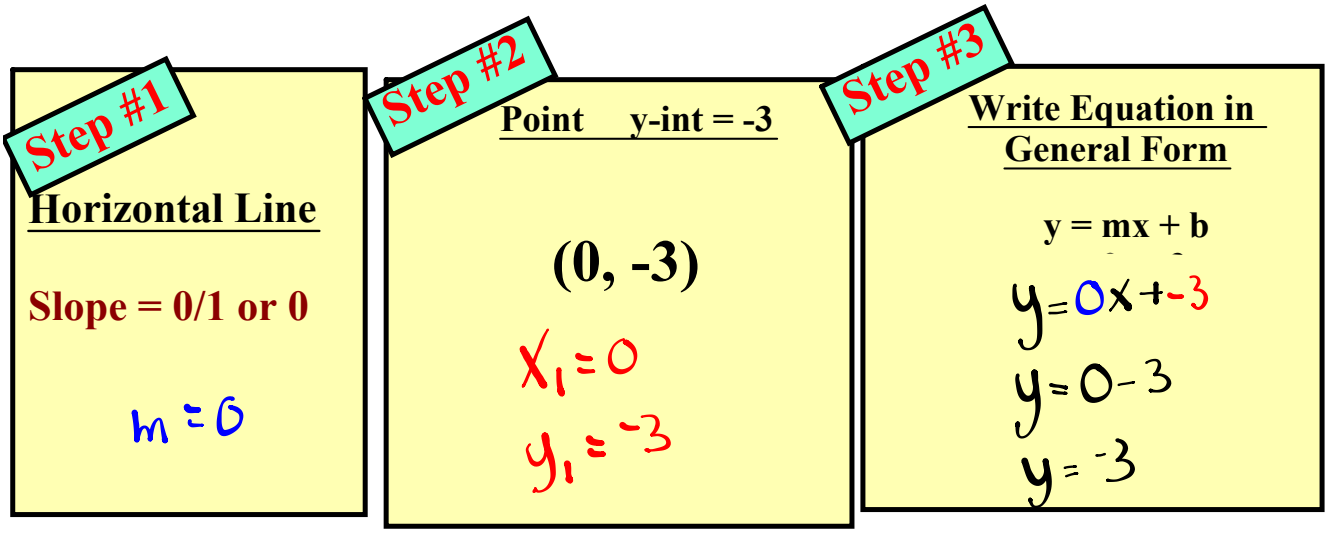
$y = \frac{5}{4}(x+2)$

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

$4y = 5x + 10$

$0 = 5x - 4y + 10$

Determine the equation of a horizontal line with a y-intercept of -3



Check out the sheet.

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