FINDING EQUATIONS OF LINES

Standard form	$Ax + By = C$	Variables are on one side (no fractions and no neg. x-term
Slope-intercept form	$y = mx + b$	Line has slope m and y-intercept b
Point-slope form	$\dfrac{y - y_1}{x - x_1} = m$	Line has slope m and contains the point (x_1, y_1)
Intercept form	$\dfrac{x}{a} + \dfrac{y}{b} = 1$	Line has x-intercept a and y-intercept b

For our purposes, we will stick to slope-intercept form.

Examples: Write an equation (in slope-int. form) for the line described.

1) The line with slope -3, passing through the point (-1, 7)

$Y = \underline{\text{slope}}\,x \pm \underline{\text{y-int}}$

y = -3x + b

plug in (-1, 7) for x & y   7 = -3(-1) + b

7 = 3 + b

4 = b

Write an equation in slope-intercept form: y = -3x + 4
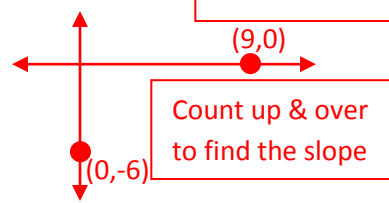
2) The line passing through the points (-4, 5) & (-2, 11)

$m = \dfrac{11-5}{-2-(-4)} = \dfrac{6}{2} = 3$

y = 3x + b   plug in either

5 = 3(-4) + b   point

5 = -12 + b

17 = b   y = 3x + 17

3) The line with x-intercept = 9 and y-intercept = -6

y = 2/3x – 6

(9,0)

When in doubt, draw it out!

(0,-6)

Count up & over to find the slope

4) The line passing through (4, 4) and parallel to the line 2x – 4y = 5

-4y = -2x + 5

y = **1/2**x – 5/4

DAY 2???

y = 1/2x + b

4 = 1/2(4) + b

4 = 2 + b

2 = b

y = 1/2x + 2

5) The vertical line passing through (-8, 2)

Since a vertical line has no ""y" in its equation, you only need the x-coordinate from this problem to write its equation:

x = -8

6) The line passing through (-3, -7) and parallel to the line passing through (-5, 0) & (-3, -8)

7) The line with x-intercept = 4 and perpendicular to the line 8x = 1 + 2y

6-8 are on the next page

8) The perpendicular bisector of the segment joining the points (-10, -13) and (2, -5)

6) Find slope for (-5,0) & (-3,-8)

$m = \dfrac{-8-0}{-3-(-5)} = \dfrac{-8}{2} = -4$

y = -4x + b   Use (-3, -7) to plug in.

-7 = -4(-3) + b

-7 = 12 + b

-19 = b

y = -4x – 19

7) Find slope from 8x = 1 + 2y

8x – 1 = 2y

4x – 1/2 = y   so, m = 4

#7 says perpendicular, so slope perp. to

m = 4 is m = -1/4

y = -1/4x + b

x-intercept of 4 = (4, 0); plug in!

0 = -1/4(4) + b

0 = -1 + b

1 = b   y = -1/4x + 1

8) Must find slope first.

$m = \dfrac{-5-(-13)}{2-(-10)} = \dfrac{8}{12} = \dfrac{2}{3}$

Perpendicular slope = -3/2

Bisector means find half way (midpoint)

$\text{mdpt} = \left(\dfrac{-10+2}{2}, \dfrac{-13+(-5)}{2} \right)$

$= \left(\dfrac{-8}{2}, \dfrac{-18}{2} \right)$

$= (-4,-9)$ this is our plug in pt.

y = -3/2x + b

-9 = -3/2(-4) + b

-9 = 6 + b

-15 = b   y = -3/2x – 15