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Equations of Lines

Slope-Intercept
$y = mx + b$

To write:
1. Find *m*, the slope.

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

If parallel, Then equal slopes
If perpendicular, Then opposite reciprocal slopes.

2. Find b, the y-intercept.
   Substitute *m* and a point, (*x*, *y*), into
   $y = mx + b$

3. With m and b, write
   $y = mx + b$

To graph:
1. Plot *b*, the y-intercept
2. From *b* use *m*, the slope, to graph the line.

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

just slope equation changed around

To write:
1. find *m*, the slope.

2. Substitute *m* and a point, (x_1, y_1), into
   $y - y_1 = m(x - x_1)$

To graph:
1. Change to Slope-Intercept form

Standard
$Ax + By = C$ no fractions

To write:
1. 1st write in Slope-Intercept or Point-Slope form.

2. Change into Standard Form using inverse operations.

To graph:
1. Change to Slope-Intercept form or make an x,y table of values.

Vertical Line (Undefined Slope)
$x = a$

No Slope

↑ some number

Horizontal Line (Zero Slope)
$y = b$

D46
side 2

Converting Between Equations of Lines

Standard
$Ax + By = C$

To write:
1. 1st write in slope-intercept or point-slope form
2. Change into standard form using inverse operations.

Slope-Intercept, $y = mx + b$
to
Standard, $Ax + By = C$

$5(y) = \left(\frac{2}{5}x - 3\right)5$ Get rid of fractions

$5y = 2x - 15$
$-2x \quad = -2x$

$-2x + 5y = -15$

$\boxed{2x + 5y = 15}$

Point-Slope, $y - y_1 = m(x - x_1)$
to
Standard, $Ax + By = C$

$y - 3 = -2(x + 4)$
$y - 3 = -2x - 8$
$+3 = \quad +3$
$y = -2x - 5$
$+2x = +2x$

$\boxed{2x + y = -5}$

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

To graph:
1. Change to slope-intercept form

Point-Slope, $y - y_1 = m(x - x_1)$
to
Slope-Intercept, $y = mx + b$

$y - 2 = \frac{1}{2}(x - 6)$
$y - 2 = \frac{1}{2}x - 3$
$+2 = \quad +2$

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

Standard
$Ax + By = C$

To graph:
1. Change to slope-intercept form or make an x,y table of values.

Standard, $Ax + By = C$
to
Slope-Intercept, $y = mx + b$

$4x - 3y = 6$
$-4x \quad = -4x$

$\frac{-3y}{-3} = \frac{-4x + 6}{-3}$

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