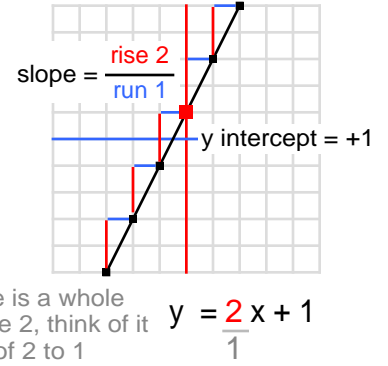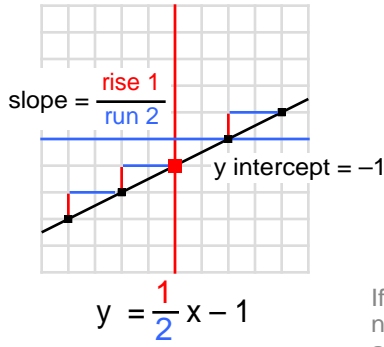# LINEAR EQUATIONS
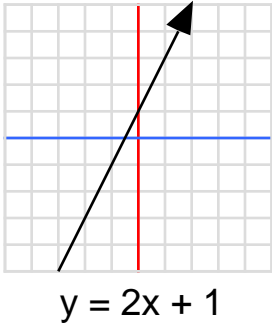
$$y = mx + b$$

slope   y intercept

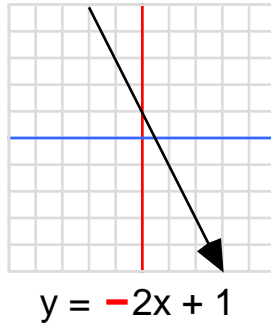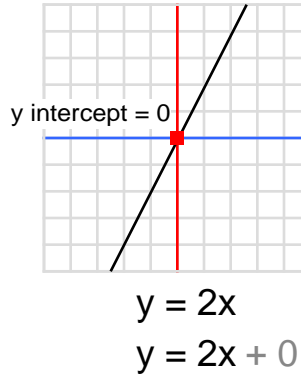$$\frac{\text{rise}}{\text{run}}$$

slope $= \dfrac{\text{rise 1}}{\text{run 2}}$

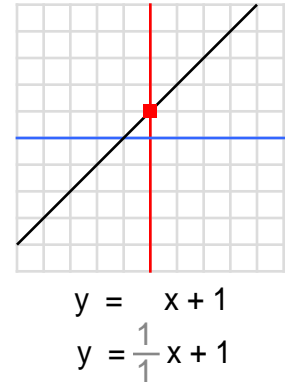$$y = \frac{1}{2}x - 1$$

slope $= \dfrac{\text{rise 2}}{\text{run 1}}$

y intercept = +1

If the slope is a whole number like 2, think of it as a ratio of 2 to 1

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

Positive slope

$$y = 2x + 1$$

Negative slope

$$y = -2x + 1$$

y intercept = 0

y intercept = 0

$$y = 2x$$
$$y = 2x + 0$$

Slope = 1

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

Horizontal line

$$y = 2$$

Vertical line

$$x = 2$$

Parallel lines

same slope

$$y = 2x + 1$$
$$y = 2x - 1$$

Perpendicular

negative reciprocal

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

"Zero slope"

(1,2)   (4,2)
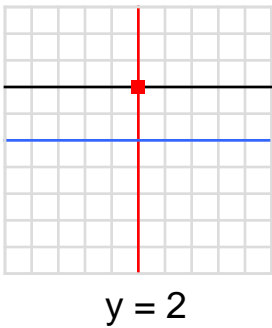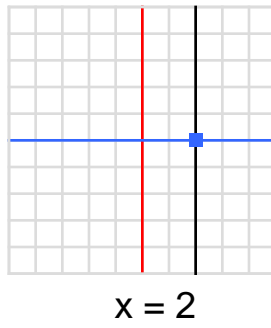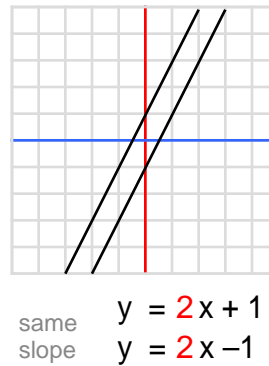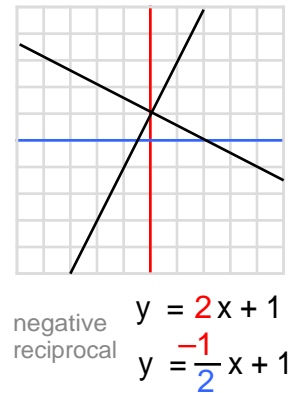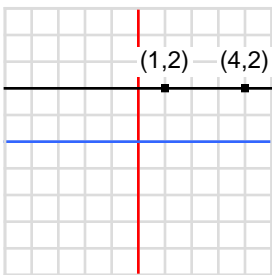
$$\frac{(4,2)}{(1,2)}$$
$$\frac{3,0}{}$$

Slope $= \dfrac{0}{3}$

0 divided by 3 = Zero

To find the slope, subtract the coordinates of one point from another and put the y over the x
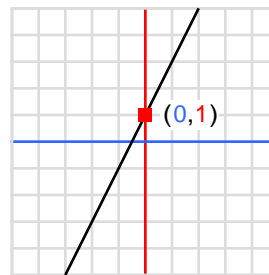
"No slope"

(2,4)

(2,1)
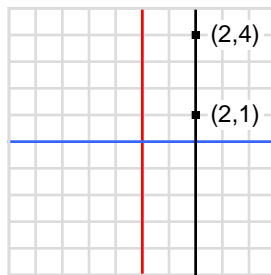
$$\frac{(2,4)}{(2,1)}$$
$$\frac{0,3}{}$$

Slope $= \dfrac{3}{0}$

Cannot divide by zero: "no slope"

y intercept

(0,1)

substitute 0 for x

$$y = 2x + 1$$
$$y = 2(0) + 1$$
$$y = 0 + 1$$
$$y = 1$$

Any point on Y axis must be at 0 on X axis

x intercept

$\left(\dfrac{-1}{2}, 0 \right)$
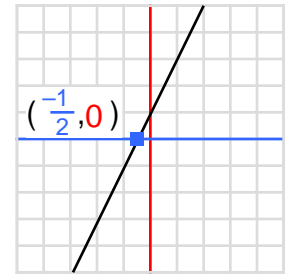
substitute 0 for y

$$y = 2x + 1$$
$$0 = 2x + 1$$
$$-1 = 2x$$
$$\frac{-1}{2} = x$$