**Linear Equations**

## Gradient-Intercept Form

$$y = mx + c$$

(0, c)

m means gradient
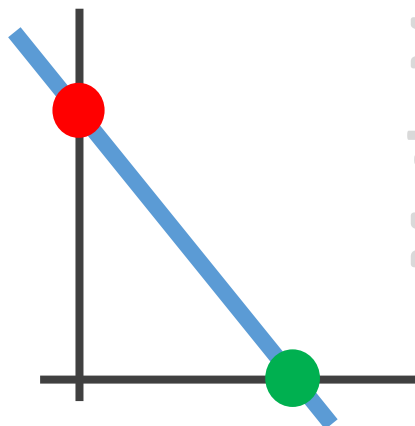
c means y-intercept
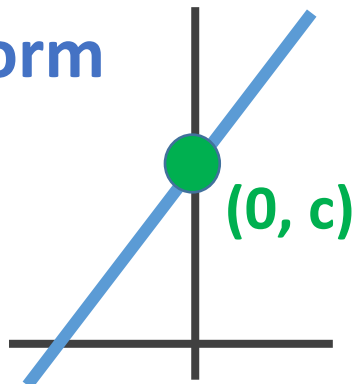
## Intercept Form

$$ax + by = c$$

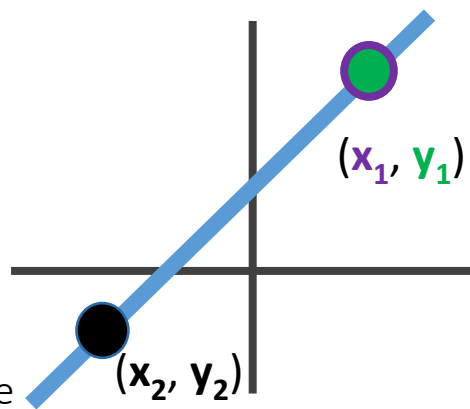To find x-intercept, make **y = 0**

To find y-intercept, make **x = 0**

## Two point Form

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

($x_1$, $y_1$) is any point on the line
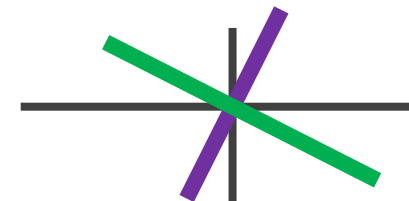
($x_2$, $y_2$) is any *different* point on the line

($x_1$, $y_1$)

($x_2$, $y_2$)

### Parallel means the same gradient

y = 2x + 3    y = 2x - 2

### Perpendicular means $m = \dfrac{-1}{m}$

y = 2x    y = -½x

### Simultaneous equations
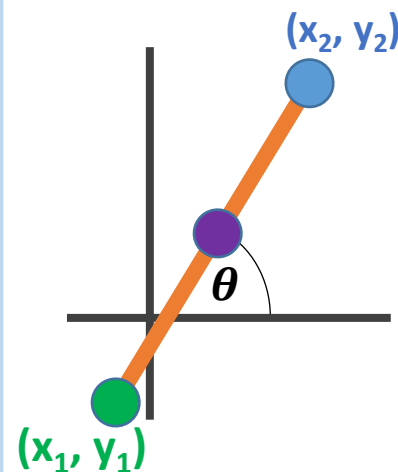means solving two or more equations at the same time.

$$y = x$$
$$y = 4 - x$$

### Substitution

y = x

y = 4 − x

### Elimination

y + y = x + 4 − x

($x_2$, $y_2$)

($x_1$, $y_1$)

$\theta$

**Length of line Segment** $= \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

**Co-ordinate of Midpoint** $= \left(\dfrac{x_1 + x_2}{2}, \dfrac{y_1 + y_2}{2}\right)$

$$\theta = \tan^{-1}(\text{gradient})$$

$$\text{gradient} = \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{\text{rise}}{\text{run}}$$

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