GRAPHING

Learning Goals:

- Identify straight lines and quadratics
- Graph using equations
- Determine equations from graph

What do you remember about Linear Relations?

- straight lines
- slope
- y-intercept
- equation is $y=mx+b$
- line of best fit
- independent variable is x
- dependent variable is y

Slope & Y-intercept Form

y = mx + b

What does the **m** and **b** represent?

slope

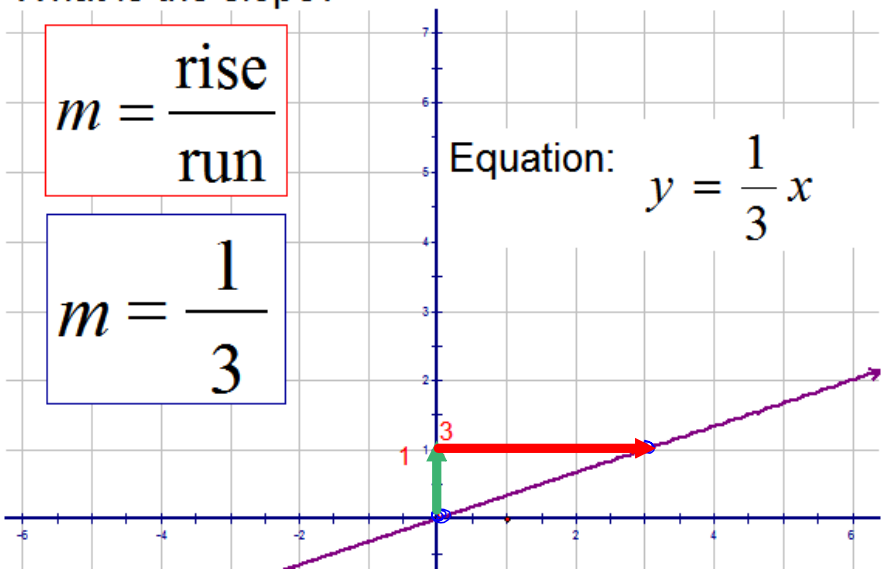
y-int

Exploring the **m**

- What is the slope?

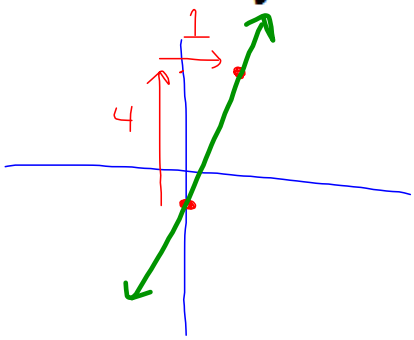
$$m = \frac{\text{rise}}{\text{run}}$$

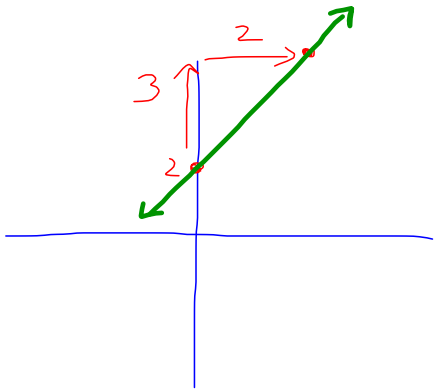
$$m = \frac{1}{3}$$



What does the equation tell you?

- $y = 4x - 1$
- $y = {}^{3}/_{2}x + 2$
- $y = {}^{1}/_{5}x - 3$
- $y = -2x + 0$ ← y-int
- $y = {}^{-5}/_{2}x + 10$





A Runner's Time

	Time (s) x	Distance (m) y
*	0	0
	1	2
	2	4
	3	6
*	4	8

1st diff.

2 - 0 = 2
4 - 2 = 2
6 - 4 = 2
8 - 6 = 2

Initial Value: $x = 0 \rightarrow y = 0$

Rate: slope → 1st diff.

Independent Variable: Time

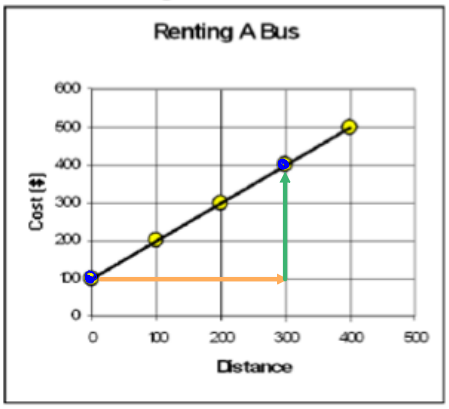
Dependent Variable: Distance

$$\frac{y_2 - y_1}{x_2 - x_1} = \frac{8-2}{4-1}$$

$$= \frac{6}{3}$$

$$= 2$$

Cost of Renting a Bus



Initial Value: 100

Rate: slope $= \frac{300}{300} = 1$

Independent Variable: Distance

Dependent Variable: Cost

Money, Money!

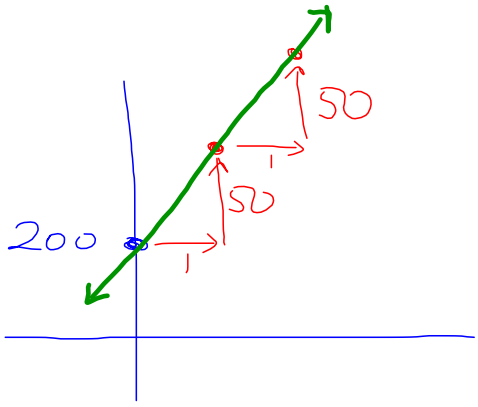
Ayda receives a base salary of $200 and $50 for every audio system he sells.

Initial Value: 200

Rate: 50

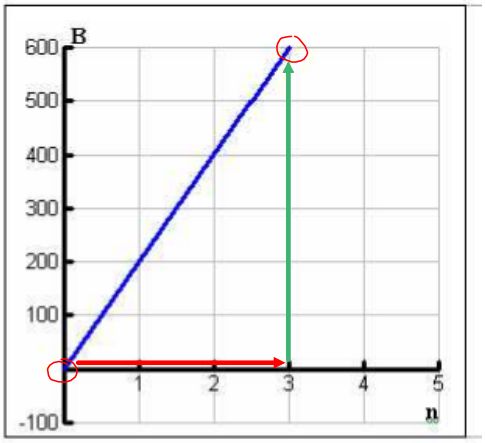
Independent Variable: # of items sold

Dependent Variable: Pay



On the Boards...

Find the equation of the line.



$m = \frac{600}{3} = 200$

$\therefore y = 200x$

What do you remeber about Quadratics?

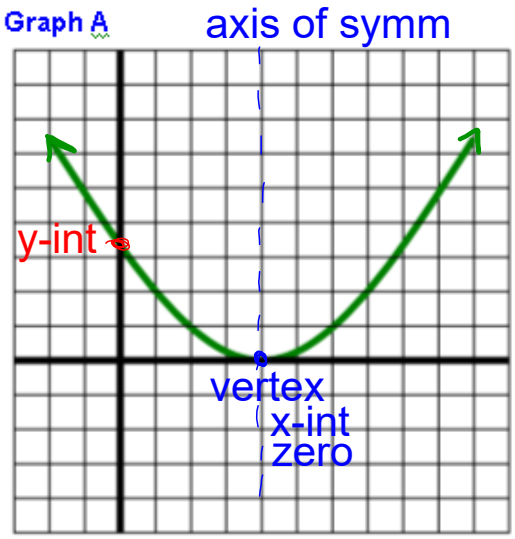
vertex

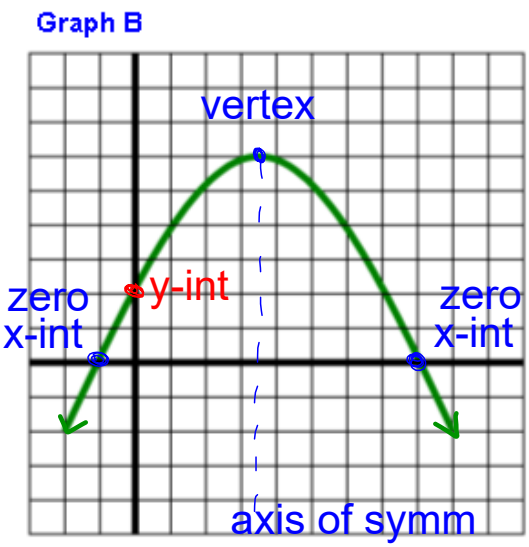
zeros

axis of symmetry

factoring

parabola





Worksheet - question 1

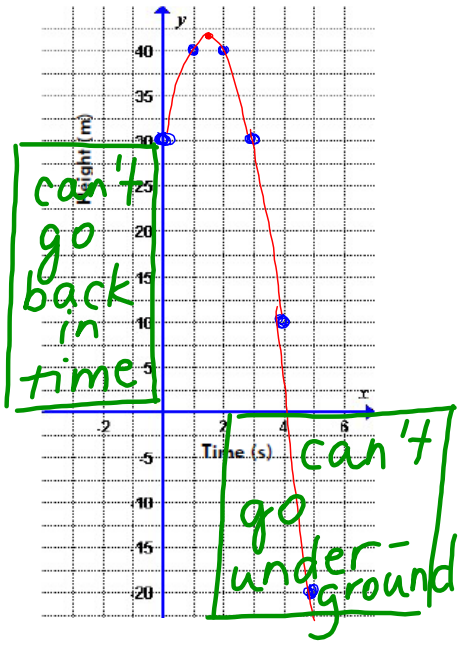
A rock is thrown off a cliff according to the equation $y = -5x^2 + 15x + 30$, where y represents the height of a cliff (in metres), and x represents the time (in seconds).

a) Fill in the table of values using x values from -2 to 5

x	$y = -5x^2 + 15x + 30$	1st Diff.	2nd Diff.	(x, y)
0	30			
1	40			
2	40			
3	30			
4	10			
5	-20			
6	-60			
7				

vertex (1.5, 41.25)

b) Graph the relation and draw the axis of symmetry.



c) **Is the relation linear or quadratic? Describe the THREE ways you can tell.**

quadratic

- 2nd diff are the same
- equation → x^2
- parabola shape

d) **Analysis – Use the graph to answer the following questions.**

i. How high is the rock after 1 second? 40 m

ii. How high is the cliff? 30 m

iii. How long does it take for the rock to hit the ground? 4.37 sec

iv. What is the maximum height reached by the rock? 41.25 m

v. When does the rock reach its maximum height? 1.5 sec

vi. When is the rock at 20 m? 3.56

What two numbers ...

Multiply to : 36

Add to: 15

Answer: 12 & 3

Multiply to : 12

Add to: -7

Answer: -3 & -4

What two numbers ...

Multiply to : -12

Add to: 4

Answer: 6 & -2

Multiply to : -40

Add to: -6

Answer: -10 & 4

Trinomial Factoring

$y=x^2+5x+6$

$=(x+2)(x+3)$

$y=x^2-x-2$

$=(x-2)(x+1)$

$y=x^2-7x+12$

$=(x-3)(x-4)$

$y=x^2-4x+3$

$=(x-3)(x-1)$

On the Boards...

Fill in the box and sketch.

1. standard form:
$y = x^2 + 3x + 2$

↑ opens up

factored form:

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

y-intercept:

$x = 0$

$y = 0^2 + 3(0) + 2 = 2$

first x-intercept:

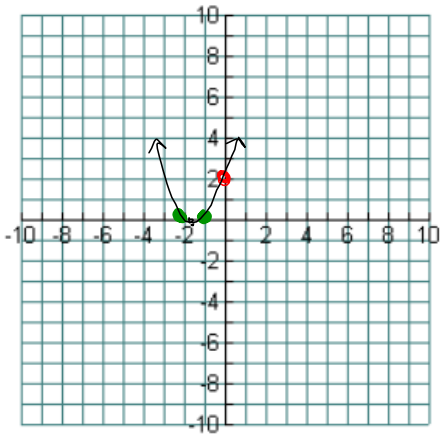
$x + 2 = 0$

$x = -2$

second x-intercept:

$x + 1 = 0$

$x = -1$



No homework for today!