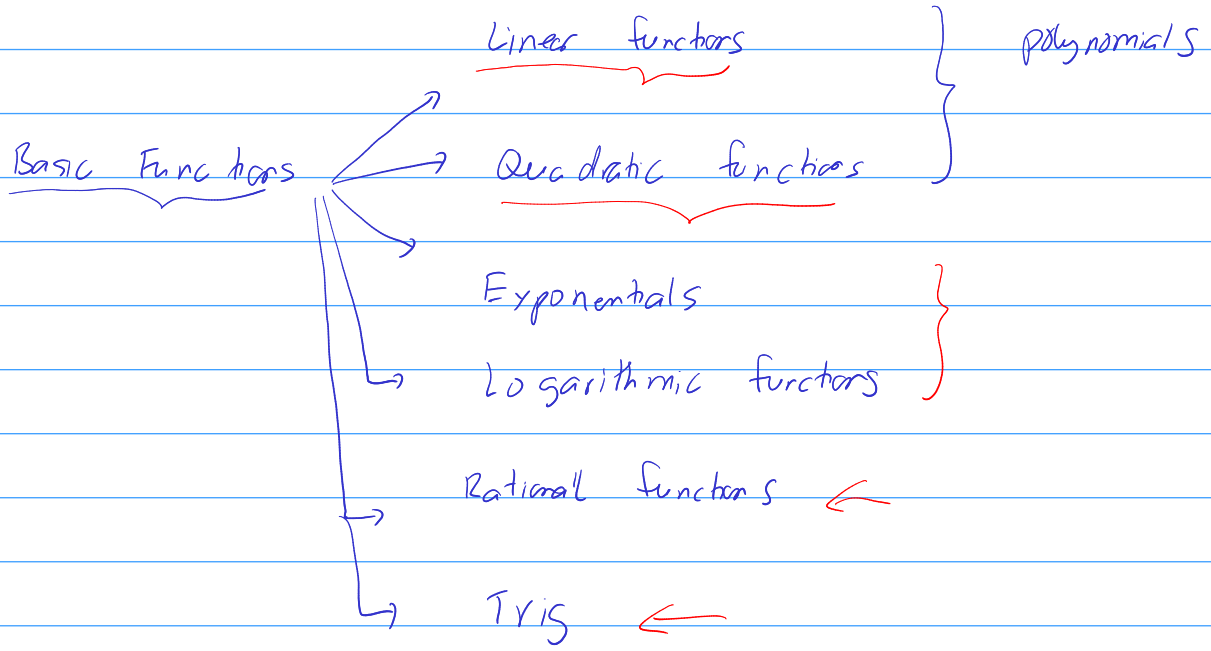
Basic Functions and their applications.

① Linear Functions



$$y = f(x) = mx + b$$

- y: output
- x: input
- m: the slope
- b: intrcpt

Example:

$$y = 2x + 3$$

$$f(x) = 2024x + 1$$

- 2024: slope
- 1: intrcpt

$$y = x$$

$$y = 1 \cdot x + 0$$

- 1: slope
- 0: intrcpt

Linear functions

$y = 2x^2 + 4$ (non - linear)

$y = 2 \cdot \frac{1}{x} + 3$

Example 1

$y = f(x) = 3x + 4$

Find $f(0)$, $f(-1)$

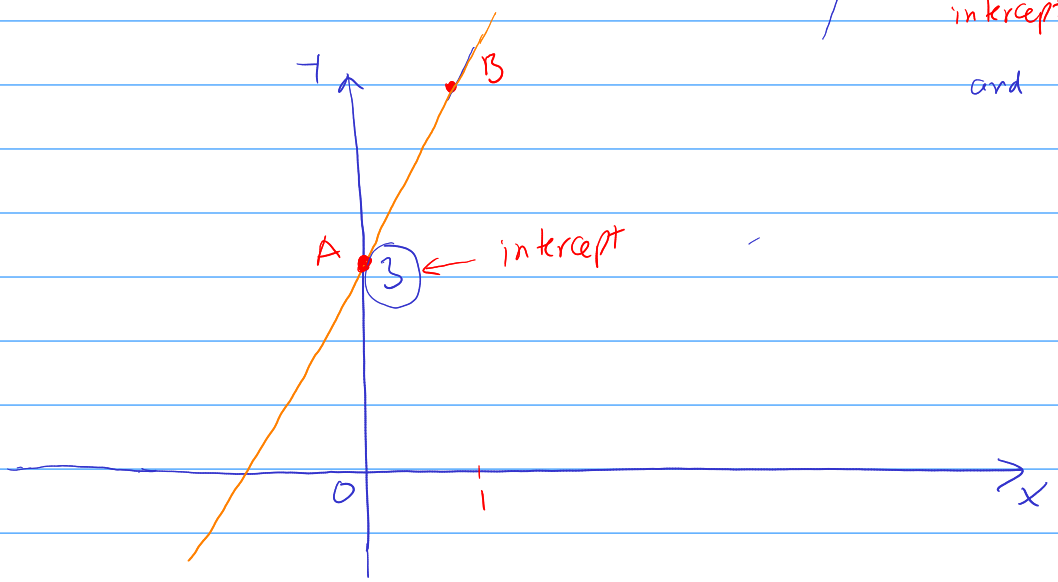
$f(0) = 3 \cdot 0 + 4 = \boxed{4}$

$f(-1) = 3 * (-1) + 4 = \boxed{1}$

(*) The graph of linear functions

Example 2: Graph $y = 2x + 3$

3 intercept of the graph and y-axis



$x = 0$, $y = 2 * 0 + 3 = 3$ $\Rightarrow$ point A (0, 3)

$x = 1$, $y = 2 * 1 + 3 = 5$ $\Rightarrow$ point B (1, 5)

intercept between the function and y-axis

Example 3: $y = 2x + 3$

(1)

$x = 0 \Rightarrow y = 2 * 0 + 3 = 3$

$x = 3 \Rightarrow y = 2 * 3 + 3 = 9$

change in x: $3 - 0 = 3$

change in y: $9 - 3 = 6$

$$\frac{\text{change in } y}{\text{change in } x} = \frac{6}{3} = 2$$

Same!!

(2) $x = 11 \Rightarrow y = 11 * 2 + 3 = 25$

$x = 23 \Rightarrow y = 23 * 2 + 3 = 49$

$$\frac{\text{change in } y}{\text{change in } x} = \frac{49 - 25}{23 - 11} = \frac{24}{12} = 2$$

Assignment 1

Prob 1: Give 2 examples of linear functions

Give 2 examples of non-linear functions

Prob 2: Let $y = h(x) = -3x + 1$

Find $h(0)$, $h(1)$

Prob 3 Graph $y = -3x + 1$

Take photos of the solutions then email me for grading.

By 9:45 AM