MATH 10A - Week 1

1.1 Function

$$2 \rightarrow \boxed{function} \rightarrow 3$$

$$f(2) = 3$$
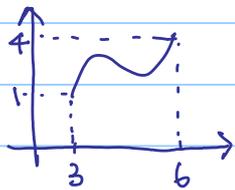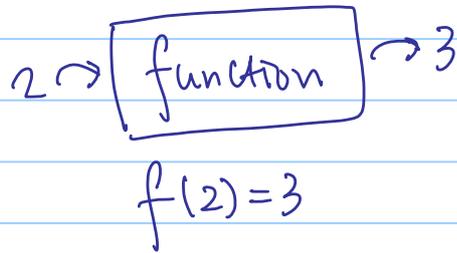
Domain $= [3, 6]$

Range $= [1, 4]$

Linear function
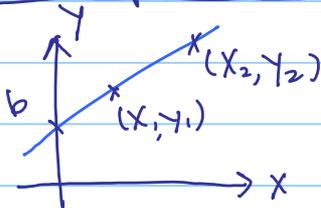
$$y = mx + b$$

slope → m

b → y-intercept

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

Inverse of a function

$$f^{-1}(y) \neq \frac{1}{f(y)}$$

E.g. $f(x) = x + 3$, Find $f^{-1}(4)$

Ans: want to solve $f(x) = 4$

$$x + 3 = 4$$
$$x = 1$$

$$\therefore f^{-1}(4) = 1$$

Past paper question

Let $f(x) = \dfrac{x}{x+2}$, $g(x) = x-5$. Find

a) $f(g(6))$

b) $f(f(1))$

c) $f(g^{-1}(5))$

d) $f(g(x))$

a) $\quad g(6) = 6-5 = 1$

$\quad f(g(6)) = f(1) = \dfrac{1}{1+2} = \dfrac{1}{3}$

b) $\quad f(1) = \dfrac{1}{3}$

$\quad f(f(1)) = f\left(\dfrac{1}{3}\right) = \dfrac{\frac{1}{3}}{\frac{1}{3}+1} = \dfrac{1}{7}$

c) To find $g^{-1}(5)$. Need to solve $g(x) = x-5 = 5 \Rightarrow x = 10$

$\quad \therefore f(g^{-1}(5)) = f(10) = \dfrac{10}{10+2} = \dfrac{5}{6}$

d) $\quad f(g(x)) = f(x-5)$

$\quad\quad\quad = \dfrac{x-5}{(x-5)+2} = \dfrac{x-5}{x-3}$