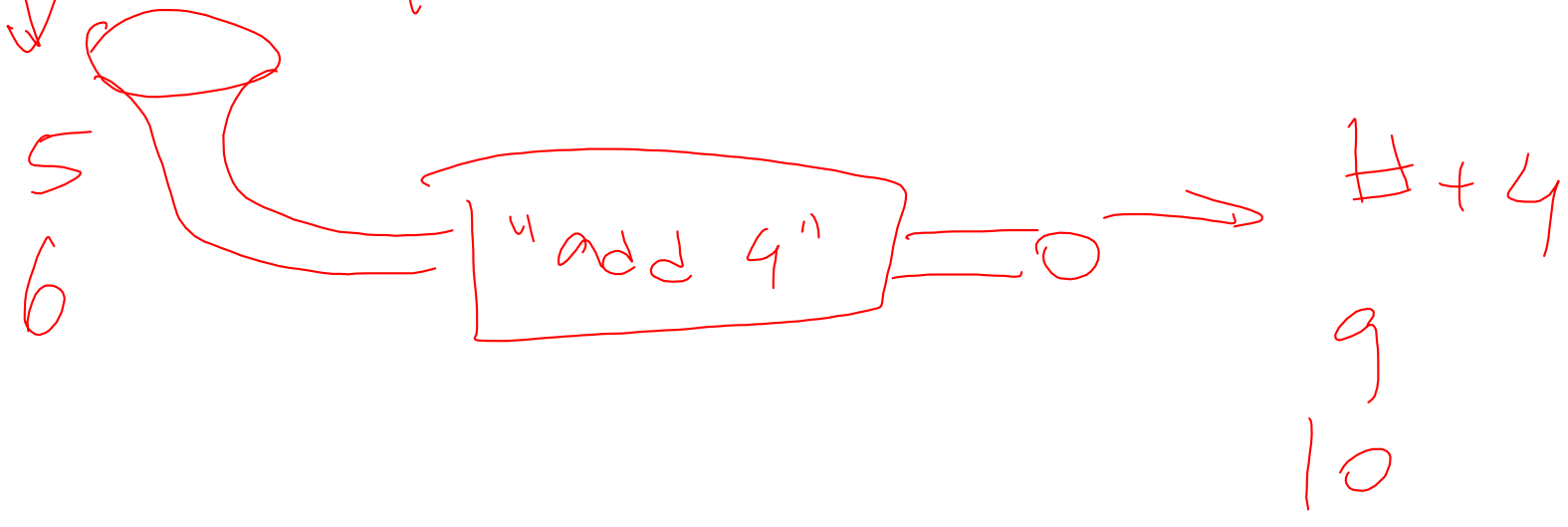
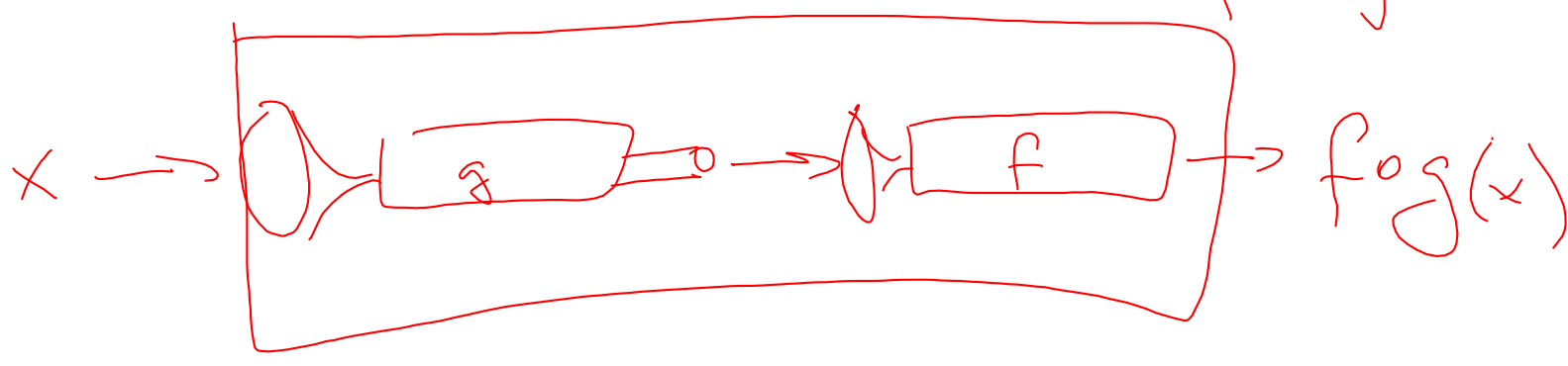


What is a function?

Real #  $f(x) = x + 4$



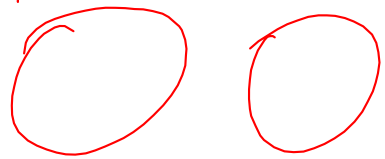
$f(x)$        $g(x)$        $f(g(x))$   
function      composition       $f \circ g$





tomatoes

peaches



blender



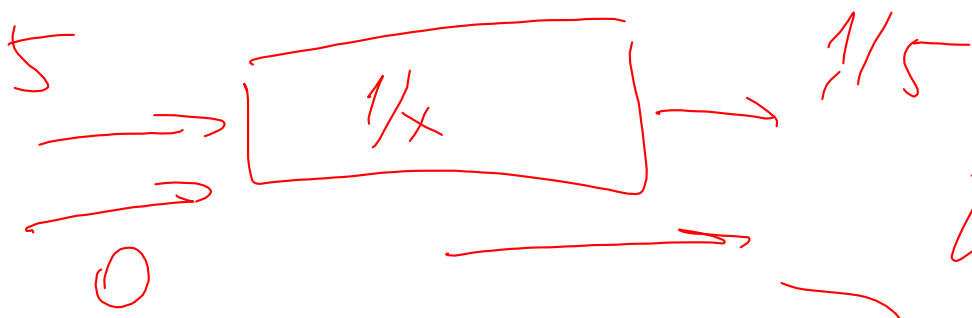
tomato  
juice



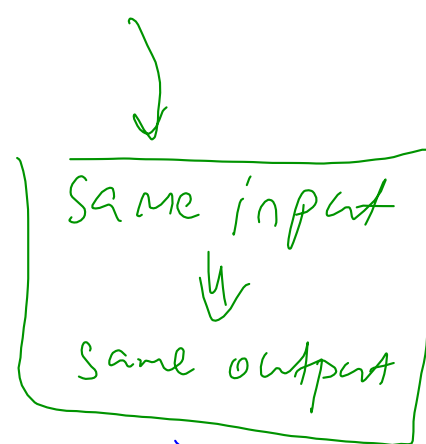
peach  
juice

Will it blend?

$$f(x) = \frac{1}{x}$$



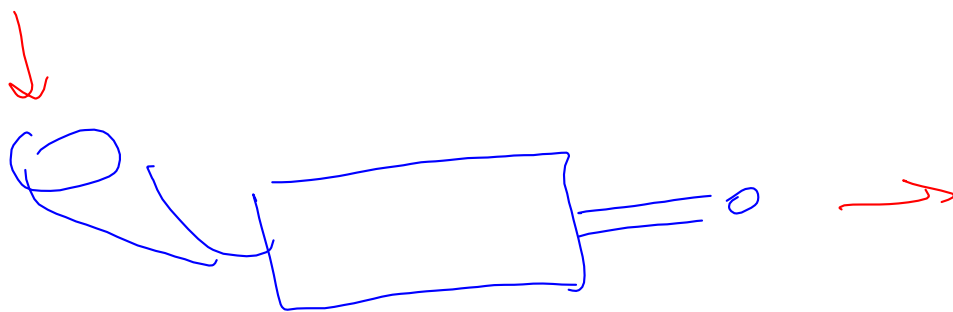
• function is a way of consistently  
assigning output to input



• domain is the set of  
possible inputs (What can I put in?)

• Range: "\_\_\_\_\_ " possible outputs  
(What can I get out?)

domain & range = instruction for  
the box



domain:  
what goes in

range:  
what comes out

E.g.:  $f(x) = \frac{1}{x-5} \neq 0$

$x-5 \geq 0$

Domain:

$(5, \infty)$

$\sqrt{x-5} \neq 0$

$x-5 \neq 0$

$x \neq 5$

$\Rightarrow x > 5$

$\frac{1}{\sqrt{6-5}} = \frac{1}{1} = 1$

In this course,

Domain

Range

Subsets of REAL #'s

$f(x) = \frac{1}{\sqrt{x-5}}$

$f(30) = \frac{1}{5}$

$\lim_{x \rightarrow \infty} \frac{1}{\sqrt{x-5}} = 0$

$f(6) = \frac{1}{\sqrt{6-5}} = 1$



$f(14) = \frac{1}{\sqrt{9}} = \frac{1}{3}$

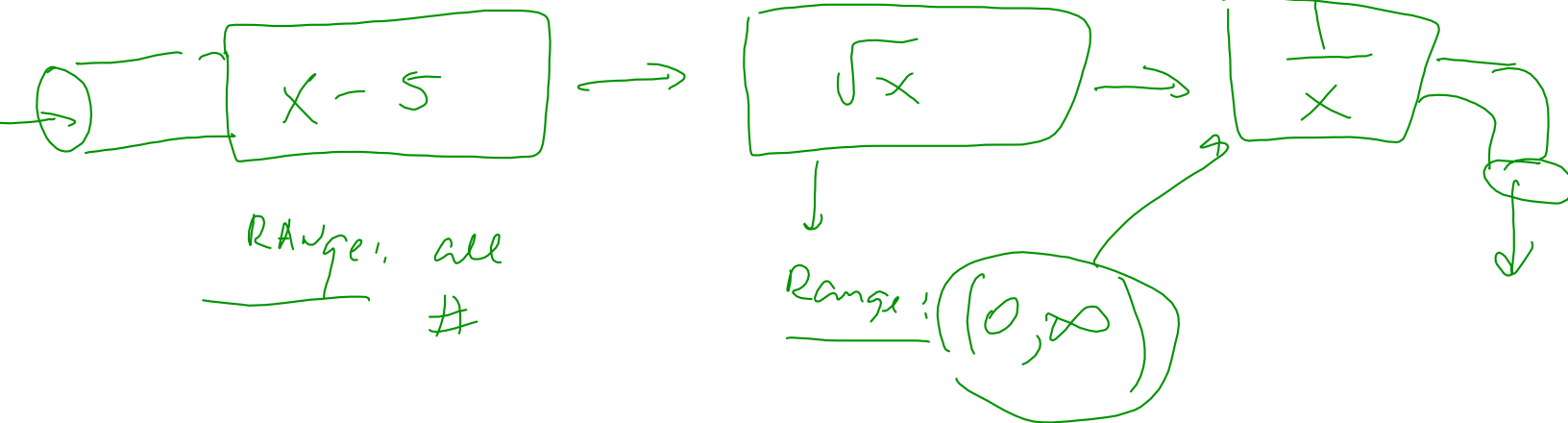
$f(5.01) = \frac{1}{\sqrt{.01}} = \frac{1}{.1} = 10$

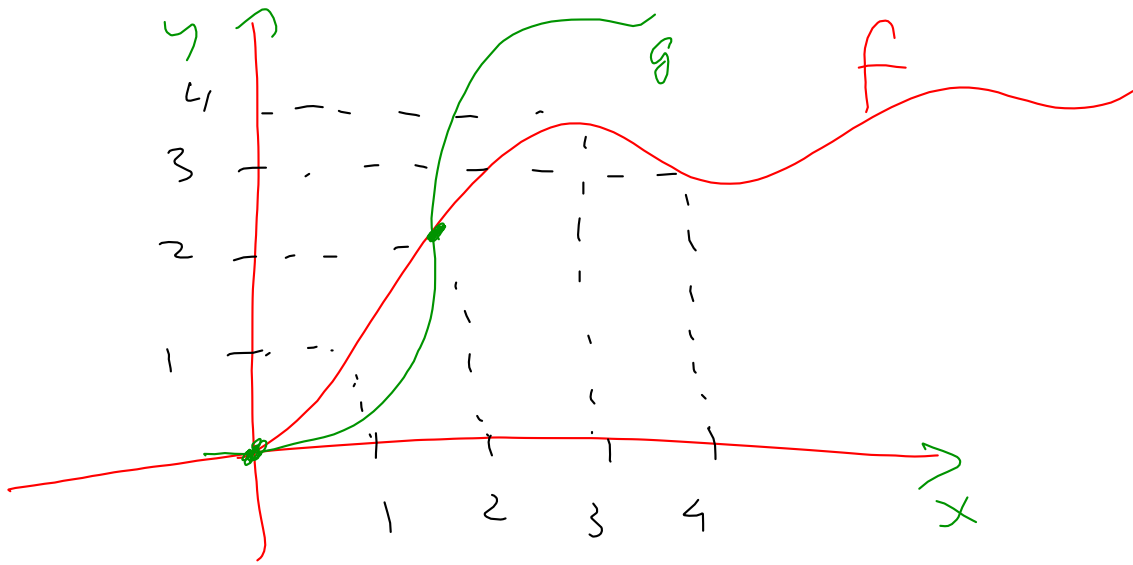
$$f(5,000) =$$

$$= \frac{1}{\sqrt{5,000}} = \frac{1}{\sqrt{1/10,000}} = \frac{1}{1/100} = 100$$

Range:  $(0, \infty)$

$$f(x) = \frac{1}{\sqrt{x-5}} \quad \begin{array}{l} 5^2 = 25 \\ (-5)^2 = 25 \end{array}$$





$$f(4) \approx 3$$

$$f(x) = g(x) \\ \approx 0, 2$$

graphs

$$f(x) = x^2$$

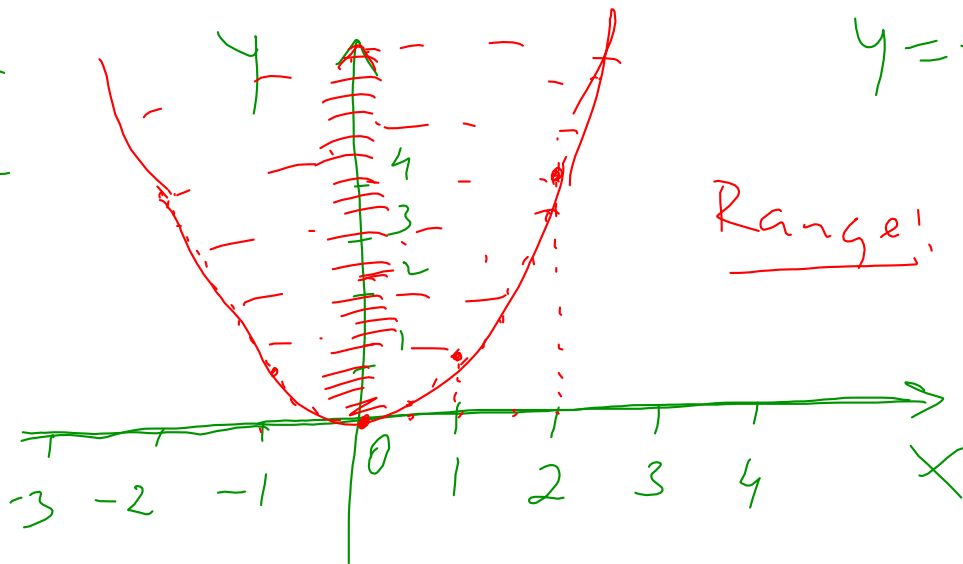
$$f(0) = 0$$

$$f(1) = 1$$

$$f(2) = 2^2 = 4$$

$$f(3) = 9$$

⋮

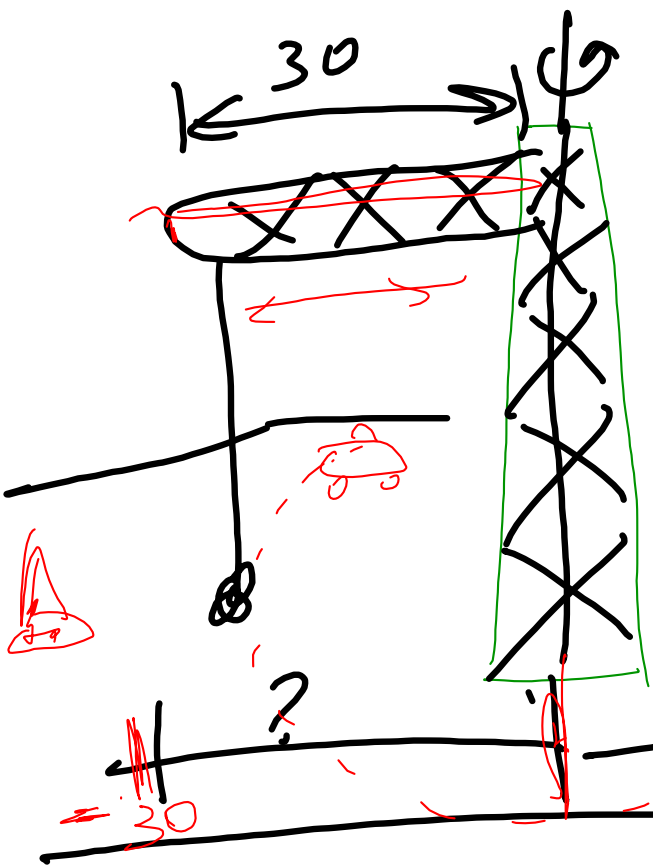


$$y = x^2$$

Range:  $[0, \infty)$

formally, a set of points

set of  $\rightarrow \{ (x, f(x)) \mid x \in \text{Domain of } f \}$  such that



$f(\theta)$  = horizontal distance of crane arm tip from the middle of the street  
 ↓  
 angle

Range (f)  
 )  
 $[-30, 30]$

$$f(\theta) = 30 \sin(\theta)$$

$[-30, 30]$

