

Agenda: 8/7/15

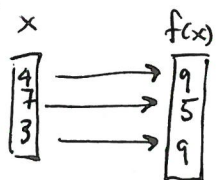
- HW Corrections: PS 5, 4
- HW leader: Me
- Lesson 6  
Function Review
- Work on PS 6, 7
- Quiz #2 Next Friday

\* Parent/Student letter handout  
typo!!!

T/F A function maps each input value to exactly one output value.

- Set of inputs to a function called Domain
- Set of outputs of a function called Range

Functions:



relation, set of ordered pairs

$$\{(4, 9), (7, 5), (3, 9)\}$$

$$g(x) = x^2 + 4$$

$$g: x \rightarrow x^2 + 4$$

"g maps x to  $x^2 + 4$ "

Not functions:

$$\{(4, 9), (7, 5), (4, -5), (3, 9)\}$$

Question: Why would the notation  $f(x)$  be better than  $y$ ?

Example:  $y = e(2s^2)$        $h(s) = e(2s^2)$  \*

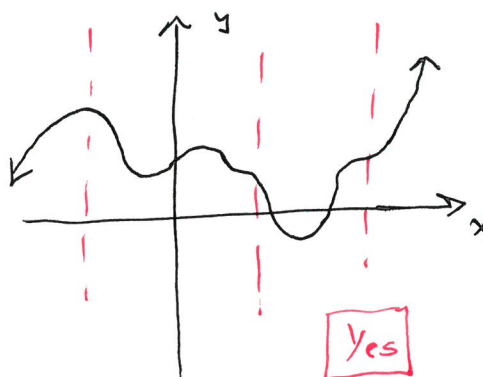
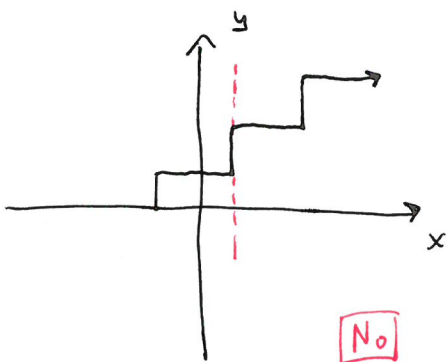
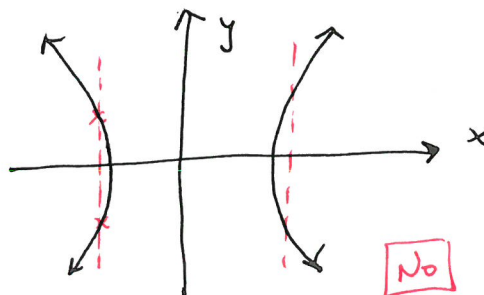
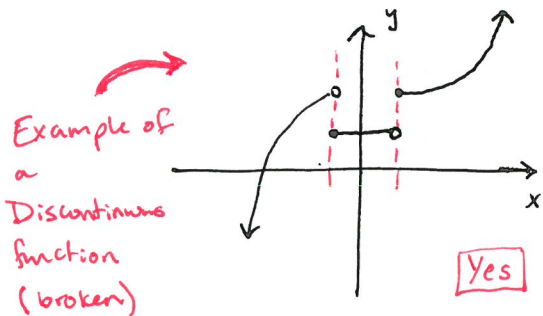
\* lets you know  $s$  is the variable, also  $y = e^8$  losses info.  
 $h(-2) = e^8$

Ex. Given  $h(t) = t^2 - 1$  find  $h(t + \Delta t)$ .

$$h(t + \Delta t) = (t + \Delta t)^2 - 1 = \boxed{t^2 + 2t\Delta t + (\Delta t)^2 - 1}$$

- The graph of a function is the set of all ordered pairs  $(x, f(x))$  where  $x$  is in the domain

Ex. Which of the following are not graphs of functions?



Ex. 6.6 T/F The mapping  $f: x \rightarrow x^4 + x^2$  is not a function because it maps both +1 and -1 to 2.

**False** This is a function because for each input there is exactly one output.

Ex. Consider  $3 + 7y^2 = x^3 - 2$

- ① Is  $y$  a function of  $x$ ? **No**  $y = \pm \sqrt{\frac{x^3 - 5}{7}}$
- ② Is  $x$  a function of  $y$ ? **Yes**  $x = \sqrt[3]{7y^2 + 5}$

Domain & Range:

Ex. A function  $C(x)$  models the cost of purchasing  $x$  boxes. What is the domain and Range (Be practical)?

Domain  $C = \{0, 1, 2, \dots\}$

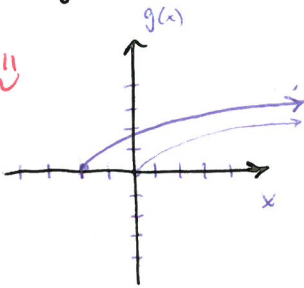
Range  $C = \{0, 25, 50, 75, \dots\}$

★ In this book we deal with functions of real numbers.

Ex. Find the domain and range of the following using their graphs:

$$g(x) = \sqrt{2+x}$$

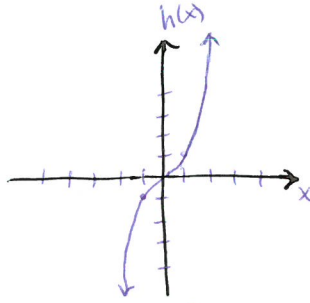
• Function Transformations ↓



$$D: \{x \in \mathbb{R} \mid x \geq -2\}$$

$$R: \{y \in \mathbb{R} \mid 0 \leq y\}$$

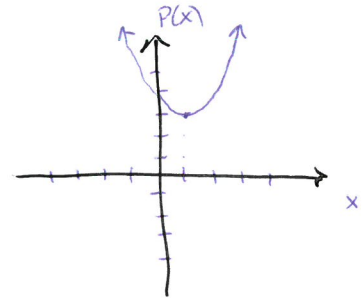
$$h(x) = x^3$$



$$D: \{x \in \mathbb{R}\} = \mathbb{R}$$

$$R: \{y \in \mathbb{R}\} = \mathbb{R}$$

$$p(x) = (x-1)^2 + 3$$



$$D: \mathbb{R}$$

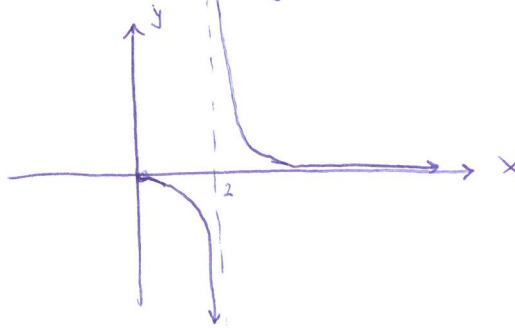
$$R: \{y \in \mathbb{R} \mid 3 \leq y\}$$

Ex. 6.10

Find the domain and range of  $f(x) = \frac{\sqrt{x}}{x-2}$

Domain:  $\left. \begin{array}{l} \text{denom: } x \neq 2 \\ \text{numer: } x \geq 0 \end{array} \right\} \boxed{\{x \in \mathbb{R} \mid 0 \leq x, x \neq 2\}}$

Range: Use a graphing calculator



Check at zero by hand  
 $f(0) = \frac{\sqrt{0}}{-2} = 0$

$\mathbb{R}$