



## 2.4 Functions

Relation: set of ordered pairs

Domain: possible x-values

Range: possible y-values

Ex: Find the Domain and Range  
of  $\{(0, 1), (-1, 4), (-1, 5), (-2, -2)\}$

$$D: \{0, -1, -2\}$$

$$R: \{1, 4, 5, -2\}$$

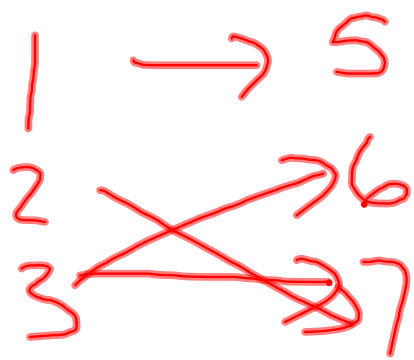
Function: relation in which no  
x-value has 2 different y values.



$\{ (1,1), (2,4), (3,5), (4,1), (5,4) \}$

Is this relation a fun?

Yes, no duplicate x's



No, 3 has  
2  $\gamma$ -values



Yes.

## Function Notation:

$f(x) \rightarrow$  "f of x"

$$f(x) = y$$

Ex:  $f(x) = 2x + 1$        $g(n) = n^2 + 2$

$$\text{Ex: } f(x) = \frac{3x}{x-5}$$

$$f(3) = \frac{3(3)}{3-5} = \left( \frac{9}{-2} \right)$$

$$f(-1) = \frac{3(-1)}{-1-5} = \frac{-3}{-6} = \left( \frac{1}{2} \right)$$

$$f(5) = \frac{3(5)}{5-5} = \frac{15}{0} \text{ undefined}$$

## Piecewise Defined Function

$$g(x) = \begin{cases} 12, & x < -2 \\ 5x - 4, & -2 \leq x < 2 \\ 10x, & x \geq 2 \end{cases}$$

$$g(3) = 10(3) = 30$$

$$g(-4) = 12$$

$$g(-2) = 5(-2) - 4 = -14$$



