

Domain \longleftrightarrow

$\{x \mid \underset{\text{smallest (left) }}{-3} \leq x \leq \underset{\text{largest (right) }}{4}, x \in \mathbb{R}\}$

Range \updownarrow

$\{y \mid \underset{-2}{-2} \leq y \leq \underset{3}{3}, x \in \mathbb{R}\}$

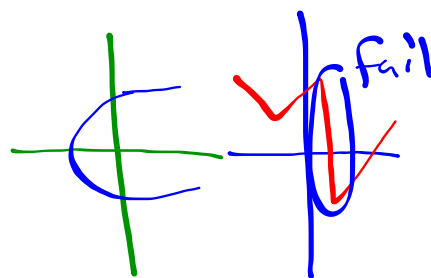
Continuous or Discrete? Why

\rightarrow Dots are connected

Function or Non-function? Why

Vertical Line test

\rightarrow only touches line in one spot everywhere



$$f(x) = 2x^2 - 7$$

$$g(x) = 3x - 1 \quad v(x) = \frac{x-1}{2}$$

Show work

a) $g(-2)$

$$\begin{aligned} g(x) &= 3x - 1 \\ g(-2) &= 3(-2) - 1 \\ &= -6 - 1 \\ &= -7 \end{aligned}$$

b) $v(7)$

$$\begin{aligned} v(x) &= \frac{x-1}{2} \\ v(7) &= \frac{7-1}{2} \\ &= \frac{6}{2} \\ &= 3 \end{aligned}$$

c) $f(x) = 43$

$$\begin{aligned} f(x) &= 2x^2 - 7 \\ 43 &= 2x^2 - 7 \end{aligned}$$

$$43 + 7 = 2x^2 - 7 + 7$$

$$\frac{50}{2} = \frac{2x^2}{2}$$

$$25 = x^2$$

$$\sqrt{25} = \sqrt{x^2}$$

$$\boxed{\pm 5 = x}$$

c) $g(10) - v(9)$

$$\begin{aligned} g(10) &= 3(10) - 1 \\ &= 30 - 1 \\ &= 29 \end{aligned}$$

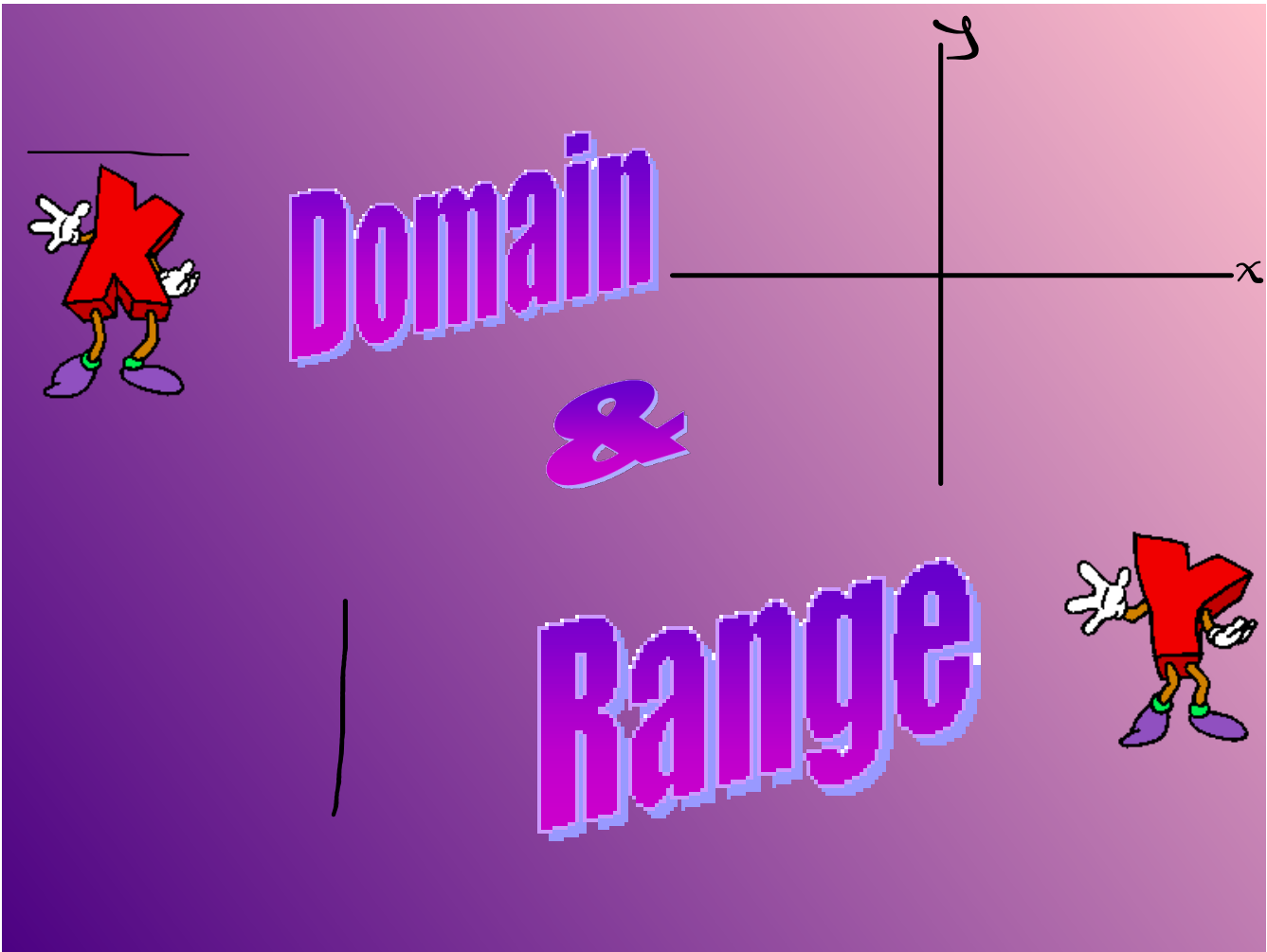
$$\begin{aligned} v(9) &= \frac{9-1}{2} \\ &= \frac{8}{2} \\ &= 4 \end{aligned}$$

$$g(10) - v(9)$$

$$29 - 4$$

$$\boxed{25}$$







Domain & Range



Domain - the set of first elements in a relation

Range - the set of second elements in a relation

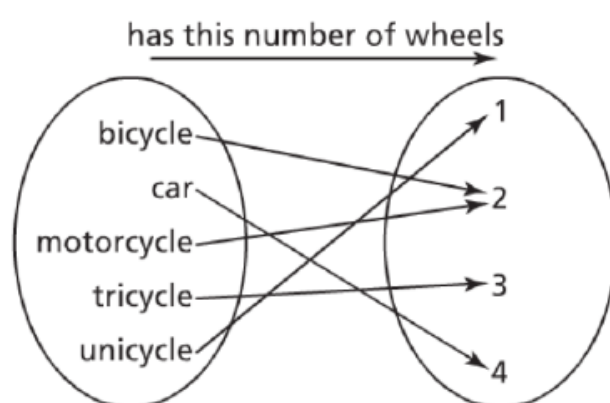
Domain
↓ x

Input	Output
1	5
2	7
3	9
4	11
5	13

y ↗ Range

Domain - 1, 2, 3, 4, 5

Range 5, 7, 9, 11, 13

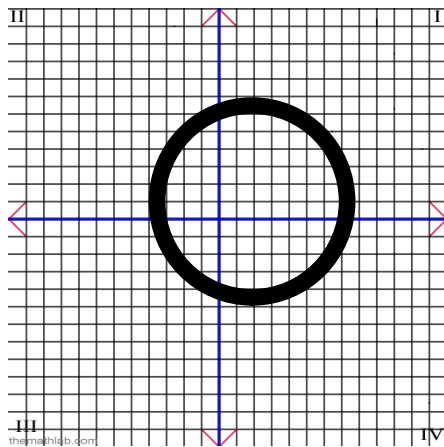
**Domain**

The first set of elements:
{bicycle, car, motorcycle, tricycle, unicycle}

Range

The second set of elements:
{1, 2, 3, 4}

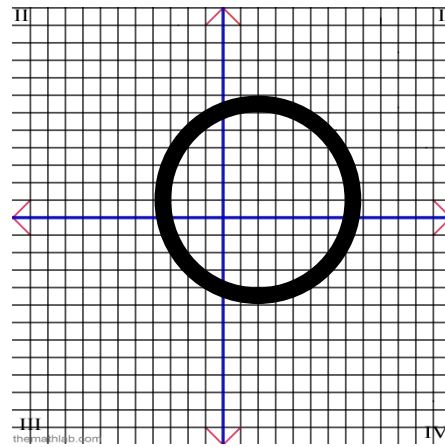
Domain



The **domain** represents all the values of x.

X is the independent Variable

Range



The **range** represents all the values of y.

Y is the dependent Variable

MATH 10
MARCH 23, 2011

FUNCTIONS

1min



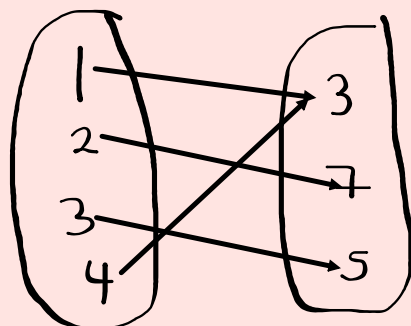
Relations VS Functions

- a **relation** is where a pattern/relationship exists between the independent variable (x) and the dependent variable(y).

- a **function** is a special relationship where...
"each x has one and only one y value".

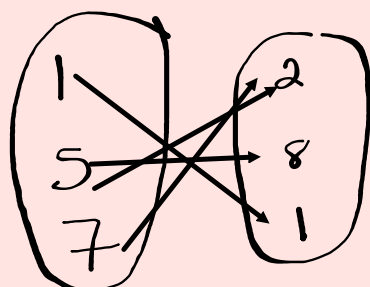
$\{ \overset{x}{(1, 3)} \overset{x}{(2, 7)} \overset{x}{(3, 5)} \overset{x}{(4, 2)} \}$

1)



F

2)



$\overset{x}{(1, 1)} \overset{x}{(5, 2)} \overset{x}{(5, 8)}$

$\overset{x}{(7, 1)} \quad N F$

Function or Nonfunction

Function:

A relation where each element in the first set is associated with one and only one element in the second set.

Functions

- How can I tell from a set of points/table?

"an x value has more than one y value"

- a function is a relation in which no two ordered pairs have the same first coordinate.

x	y
3	5
7	11
8	15
9	22

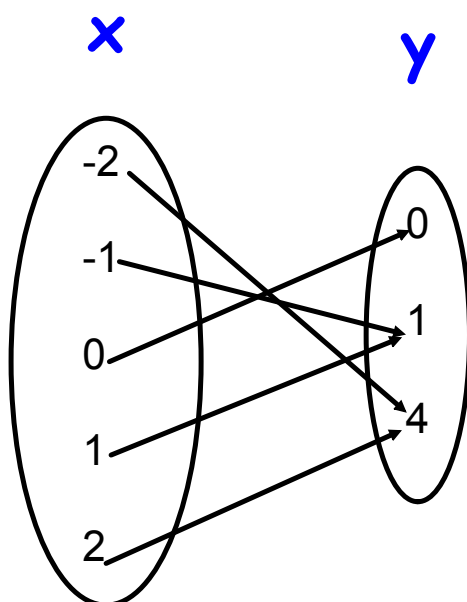
Function or Not a function
that is the question?



Arrow Diagrams

Function:

For every first element there is one and only one second element. (Only one arrow starts from each element of the domain.)



Function or Not a function
that is the question?



$(-2, 4)$, $(-1, 1)$ $(0, 0)$ $(1, 1)$ $(2, 4)$



Sport	Equipment
badminton	shuttlecock
badminton	racquet
hockey	puck
hockey	stick
tennis	ball
tennis	racquet
soccer	ball

Function or Not a function
that is the question?



$\{ (2, 5), (3, 7), (4, 2), (2, 6), (8, 0) \}$

Function or Not a function
that is the question?



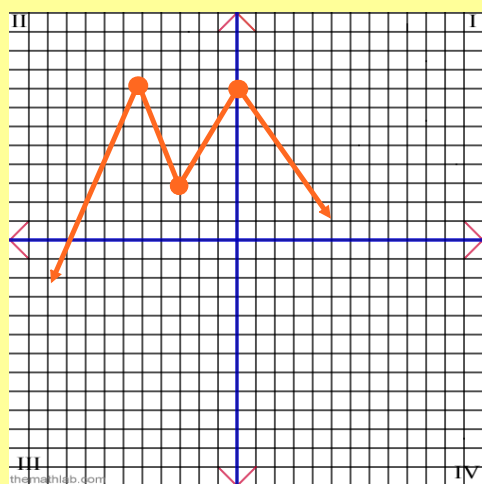
Function or Nonfunction



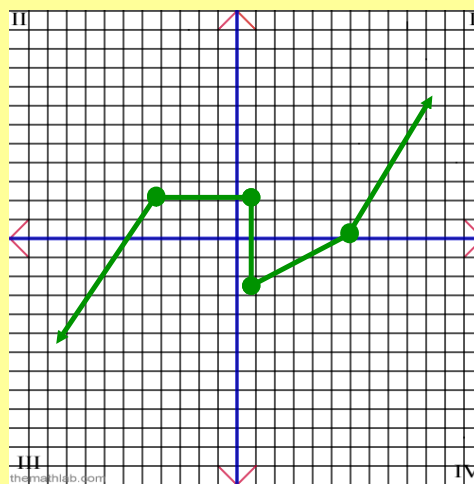
** To determine whether or not a graph is a function or nonfunction, we use what is called the vertical line test!!

** If the line crosses the graph more than once at any particular location, then it is not a function.

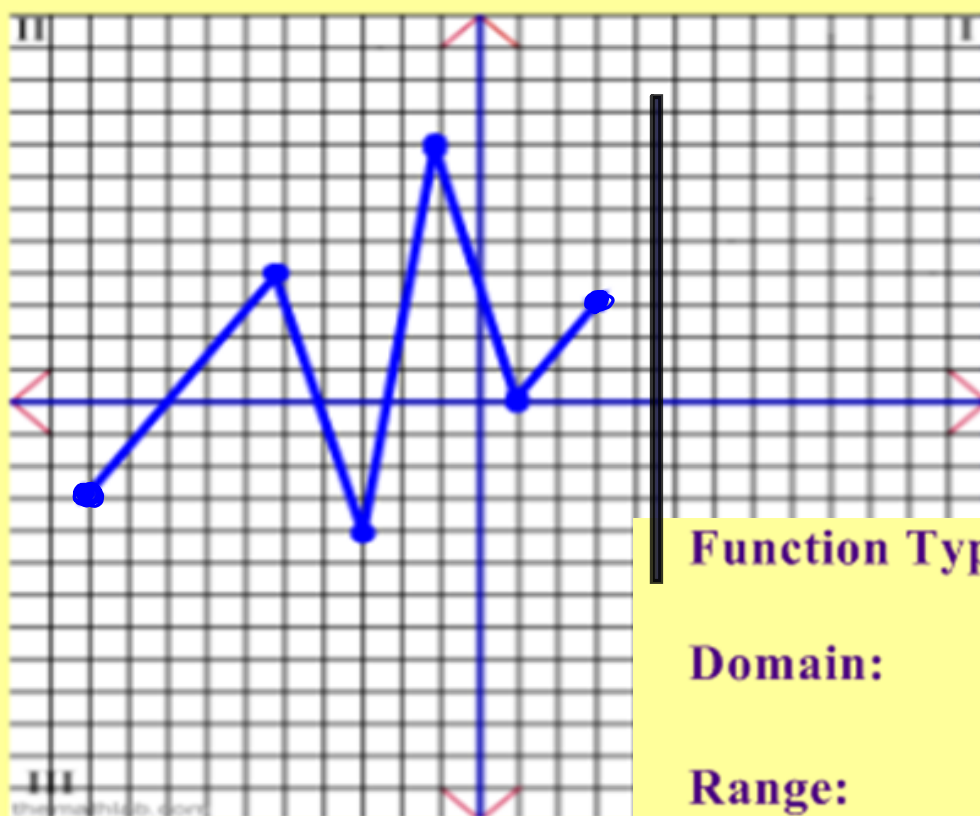
Function



Nonfunction



**** State whether the graph is a function or nonfunction, as well as stating the domain & range!!**

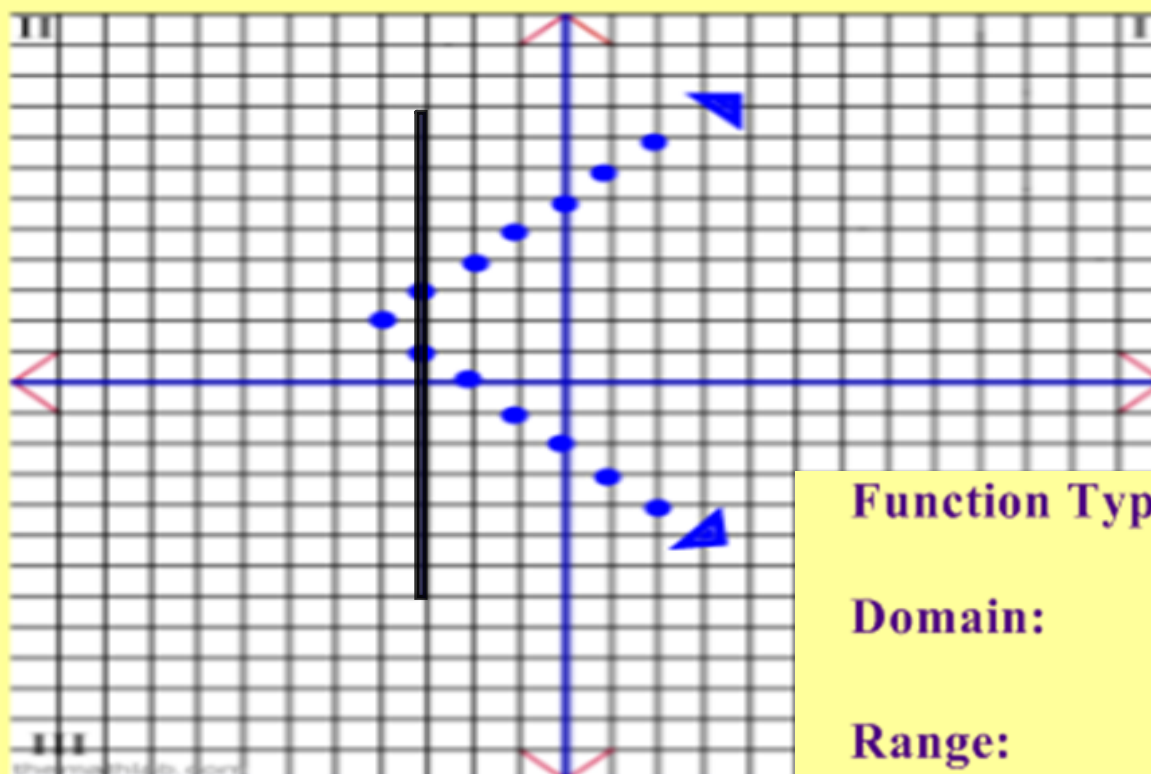


Function Type:

Domain:

Range:

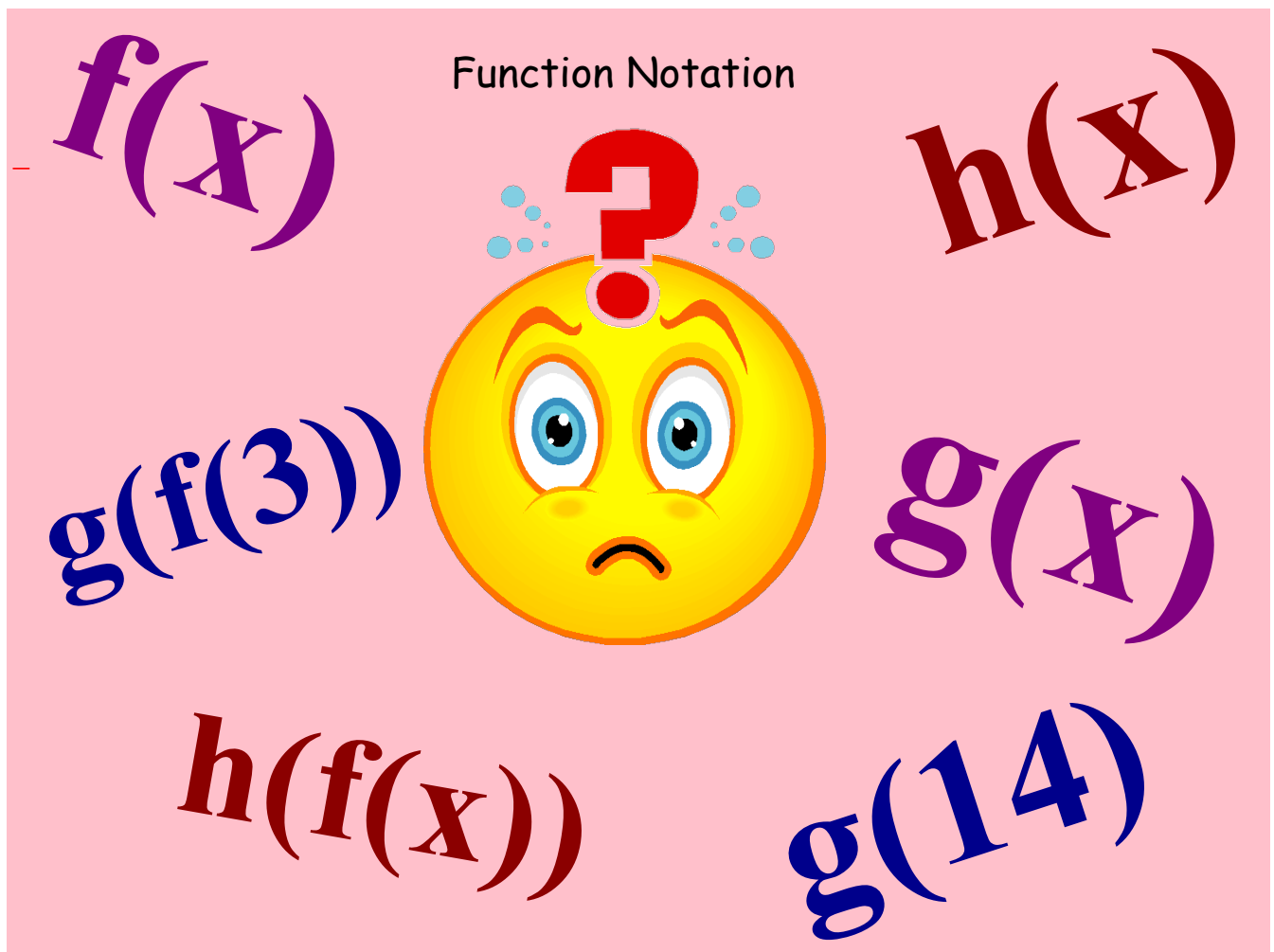
* State whether the graph is a function or nonfunction, as well as stating the domain & range!!



Function Type:

Domain:

Range:



Independent / Dependent

Dependent - a variable whose value is determined by the value of another(independent) variable.

Independent - a variable whose value is not determined by the value of another variable, and whose value determines the value of another (dependent) variable

**Independent
Variable**

- Hours do not depend on the person's pay.

**Dependent
Variable**

- A person's pay often depends on the number of hours worked.



Hours Worked, h	Gross Pay, P (\$)
1	12
2	24
3	36
4	48
5	60

Try this on your own!!!!!!!!!!!!!!!!!!!!

Example



The equation $V = -0.08d + 50$ represents the volume, V liters, of gas remaining in a vehicle's tank after travelling d kilometers. The tank is not filled until it is empty.



- a) Describe the function.
Write the equation in function notation.
- b) Determine the value of $V(600)$.
What does this number represent?
- c) Determine the value of d when $V(d) = 26$.
What does this number represent?

Function Notation

Recap

- To represent functions, we use symbols like $f(x)$ and $g(x)$.
- The symbol $f(x)$ is read "f of x" and simply means that the expression that follows involves x.

Evaluating Functions

If $f(x) = 3x^2 - x - 6$, find...

a) $f(5)$

Try These!!!

#1. If $f(x) = 3x^2 - x - 6$, find...

a) $f(5)$

b) $f(-4)$

c) $f\left(\frac{2}{3}\right)$

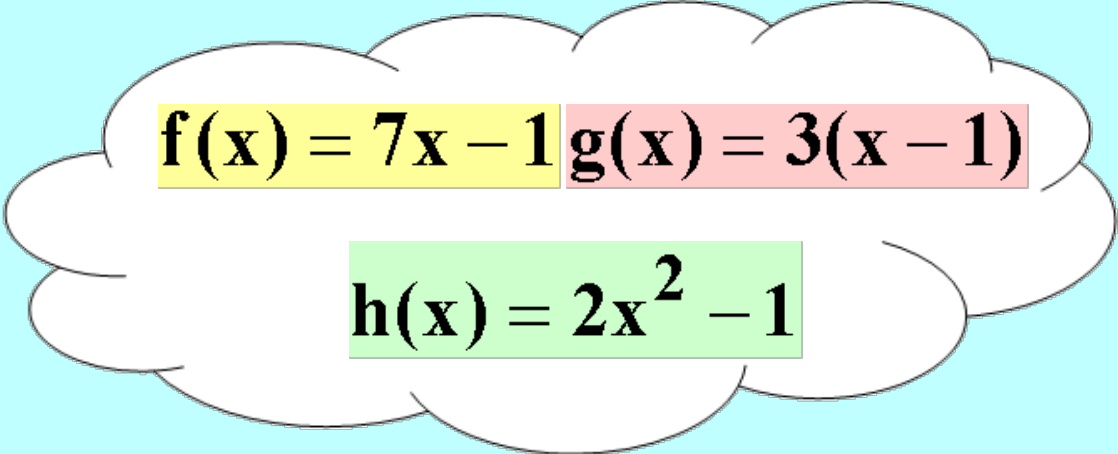

$$f(x) = 7x - 1$$

$$g(x) = 3(x - 1)$$

$$h(x) = 2x^2 - 1$$

a) $f(3)$

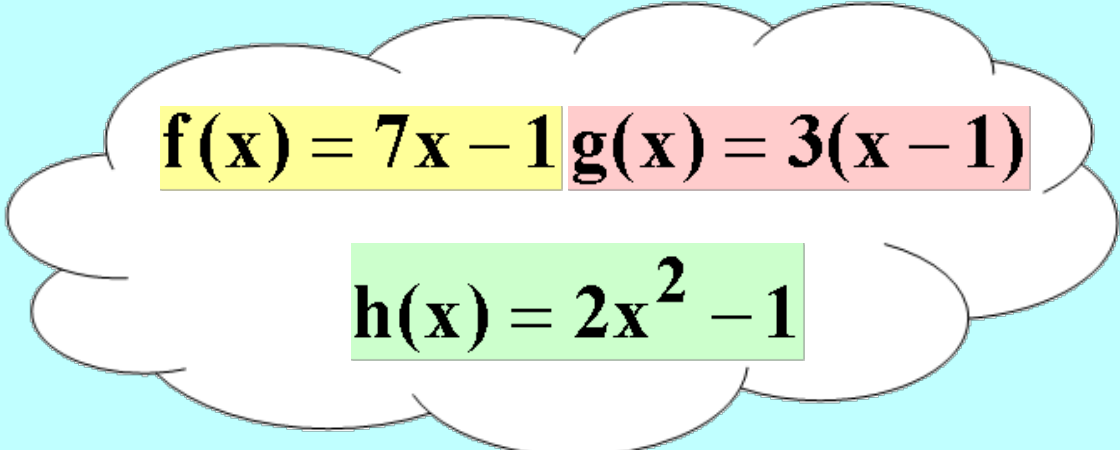
b) $h(-2)$


$$f(x) = 7x - 1 \quad g(x) = 3(x - 1)$$

$$h(x) = 2x^2 - 1$$

c) $g(3)$

d) $h(f(1))$


$$f(x) = 7x - 1 \quad g(x) = 3(x - 1)$$

$$h(x) = 2x^2 - 1$$

e) $h(2) - f(3)$