

3.1 Functions
 $y = f(x)$
 Domain x - Independent
 Range y - Dependent

$\{(2,1), (-3,1), (4,5)\}$
 Function? **yes**
 Domain $\{-3, 2, 4\}$
 Range $\{1, 5\}$

<u>A word</u>	<u>Category</u>	
x5	Size	Function? yes
Red	Color	
yellow	Number	
45	Letter	
A		

<u>Animal</u>	<u>Appendage</u>	Function?
Fish	Fins	No
Dog	Legs	
<u>Bird</u>	Wings	

$y = 3x^2 - 6x + 5$ Function?
 Values of x Plug in
 How many y 's? - One answer
yes it is a function

Functions?

$y = \frac{4}{x-3}$ $x=0 \quad y = -\frac{4}{3}$ <u>yes</u>	$y^2 = 4 - x^2$ $x=0 \quad y = \pm 2$ <u>No</u>	$x = y^2$ $x=16 \quad y = \pm 4$ <u>No</u>
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$$f(x) = 4x^2 + 3x - 2$$

(a) $f(0) = 4(0)^2 + 3(0) - 2 = -2$

(b) $f(-4) = 4(-4)^2 + 3(-4) - 2 = 64 - 12 - 2 = 50$

(c) $f(-x) = 4(-x)^2 + 3(-x) - 2 = 4x^2 - 3x - 2$

(d) $\frac{f(x+h) - f(x)}{h} = \frac{4(x+h)^2 + 3(x+h) - 2 - 4x^2 - 3x + 2}{h}$

$$\frac{4x^2 + 8hx + 4h^2 + 3x + 3h - 2 - 4x^2 - 3x + 2}{h} = \frac{8hx + 4h^2 + 3h}{h} = 8x + 4h + 3$$

(x+h)² = x² + 2hx + h²

x	h
x	x
h	h

Find $\frac{f(x+h) - f(x)}{h}$

① $f(x) = x^2 - 7x + 7$

$$\frac{(x+h)^2 - 7(x+h) + 7 - x^2 + 7x - 7}{h} = \frac{x^2 + 2hx + h^2 - 7x - 7h + 7 - x^2 + 7x - 7}{h} = \frac{2hx + h^2 - 7h}{h} = 2x + h - 7$$

② $f(x) = 2x - 3$

$$\frac{2(x+h) - 3 - 2x + 3}{h} = \frac{2x + 2h - 3 - 2x + 3}{h} = \frac{2h}{h} = 2$$

A Rock falls 32m $H(x) = 32 - 4.9x^2$

1.1 sec?

$$32 - 4.9(1.1)^2 = 26.07m$$

$f(x) = 3x + 4$ $g(x) = 9x - 7$ Domain

1) $(f-g)(x) = 3x + 4 - 9x + 7 = -6x + 11 \quad (-\infty, \infty)$

2) $(f \cdot g)(x) = (3x + 4)(9x - 7) = 27x^2 - 21x + 36x - 28 = 27x^2 + 15x - 28 \quad (-\infty, \infty)$

3) $\left(\frac{f}{g}\right)(x) = \frac{3x+4}{9x-7}$

$9x - 7 = 0 \Rightarrow x = \frac{7}{9}$

$x \neq \frac{7}{9}$

$\left(-\infty, \frac{7}{9}\right) \cup \left(\frac{7}{9}, \infty\right)$

$\{x \mid x \neq \frac{7}{9}\}$

