

Algebra 2 2.1
 Analyze relations and functions
 Use equations of relations and functions

relation

function

one-to-one function

~~onto (not one-to-one) function disregard :(~~

domain

range

continuous

discrete

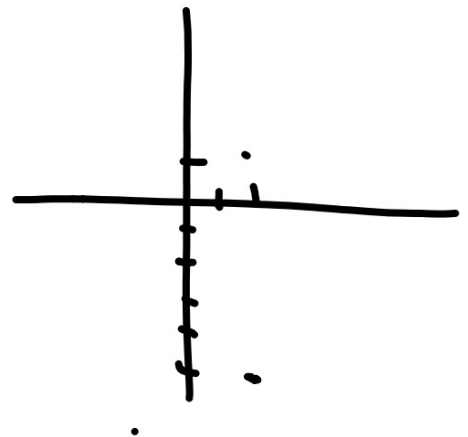
vertical line test (VLT)

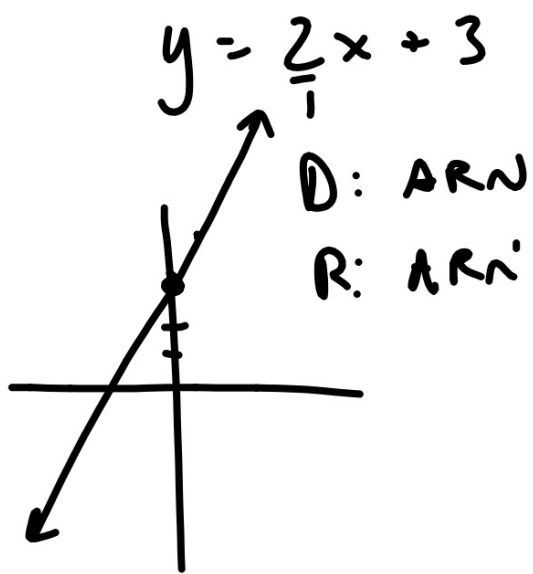
cut & paste activity

• 2 •	1 •
• 3 •	5 •
• 4 •	0 •
2	-6 •

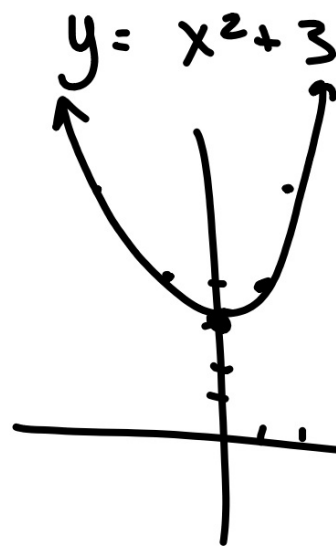
independent variable
 dependent variable
 function notation

• 0 •	6 •
• 2 •	6 •
• 5 •	1 •



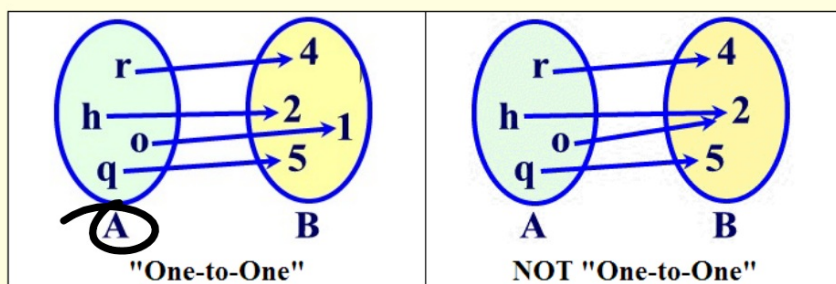


D: $\mathbb{R}$
R: $y \geq 3$



	$x^2 + 3$
0	$0 + 3$
1	$1 + 3$
2	$4 + 3$
-1	$1 + 3$

In a one-to-one function, given any y there is only one x that can be paired with the given y .
Such functions are referred to as injective.



function? *yes*
1:1

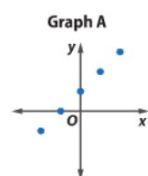
function? *yes*
not 1:1

Function: Does every x have a single partner?

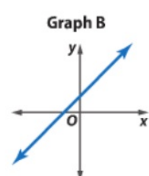
One to one function: Does every x have a single partner?

AND Nobody shares a y partner either?

A relation in which the domain is a set of individual points, like the relation in Graph A, is said to be a **discrete relation**. Notice that its graph consists of points that are not connected. When the domain of a relation has an infinite number of elements and the relation can be graphed with a line or smooth curve, the relation is a **continuous relation**.



discrete relation



continuous relation

Number of pets

Weight of a pet

spaghetti & nickles

When an equation represents a function, the variable, often x , with values making up the domain is called the **independent variable**. The other variable, often y , is called the **dependent variable** because its values depend on x .

Function notation (algebra 1) every place you see an x, substitute
cut & paste

Example 4 Evaluate a Function

Given $f(x) = 2x^2 - 8$, find each value.

a. $f(6)$

$$f(6) = 2 \cdot (6)^2 - 8$$

$$= 2 \cdot 36 - 8$$

$$f(6) = 64$$

b. $f(2y)$

$$f(2y) = 2(2y)^2 - 8$$

$$2 \cdot 4y^2 - 8$$

$$f(2y) = 8y^2 - 8$$

Guided Practice

Given $g(x) = 0.5x^2 - 5x + 3.5$, find each value.

4A. $g(2.8)$

$$\begin{aligned} & .5(2.8)^2 - 5(2.8) + 3.5 \\ & 3.92 - 14 + 3.5 \\ g(2.8) &= -6.58 \end{aligned}$$

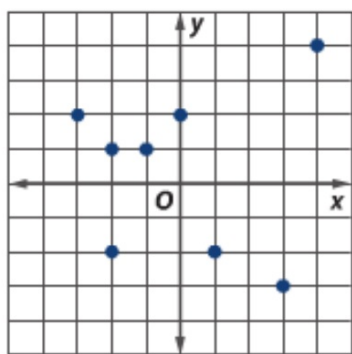
4B. $g(4a)$

$$\begin{aligned} & = 0.5(4a)^2 - 5(4a) + 3.5 \\ & \quad 0.5(16a^2) \\ g(4a) &= 8a^2 - 20a + 3.5 \end{aligned}$$

whiteboards

State the domain and range of each relation. Then determine whether each relation is a *function*. If it is a function, determine if it is *one-to-one*, ~~onto~~, *both*, or *neither*.

1A.



no func.

D: -3, -2, -1, 0, 1, 3, 4
R: 4, 2, 1, -2, -5

1B.



func. not 1:1

D: -3, -2, 0, 1
R: 0, 2, 4, 6, 8

KeyConcept Vertical Line Test

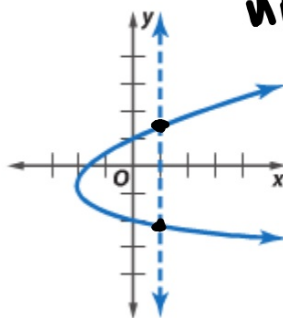
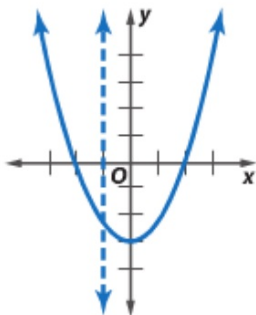
Words

If no vertical line intersects a graph in more than one point, the graph represents a function.

If a vertical line intersects a graph in two or more points, the graph does not represent a function.

Models

fn.



no func.

WB 2.1 prac.

if $s_k \rightarrow 6$