Algebra 1 1.7

Determine whether a relation is a function.

Find function values

relation

function every x has one partner

discrete

continuous

vetical line test VLT

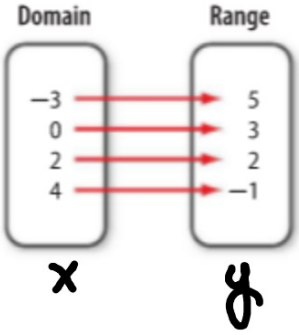
cut & paste activ

Every input has exactly one output!

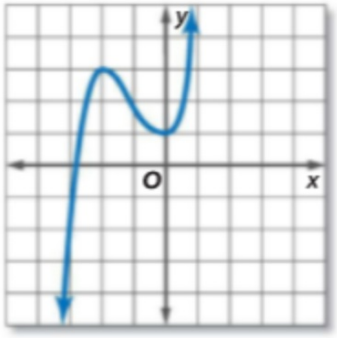
KeyConcept Function

Words A function is a relation in which each element of the domain is paired with *exactly* one element of the range.

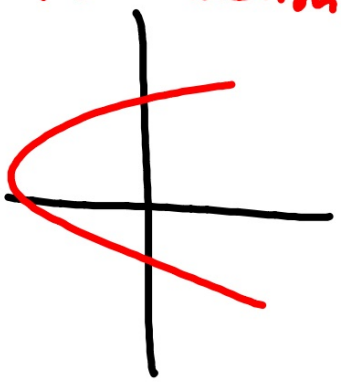
Examples



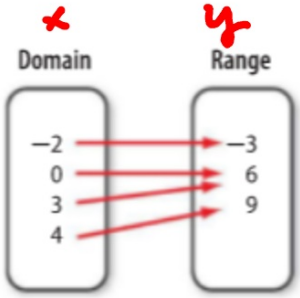
function



no function



a.



b.

Domain	1	3	5	1
Range	4	2	4	−4

Guided Practice

1. $\{(2, 1), (3, -2), (3, 1), (2, -2)\}$ (2, 2)

$y = mx + B$

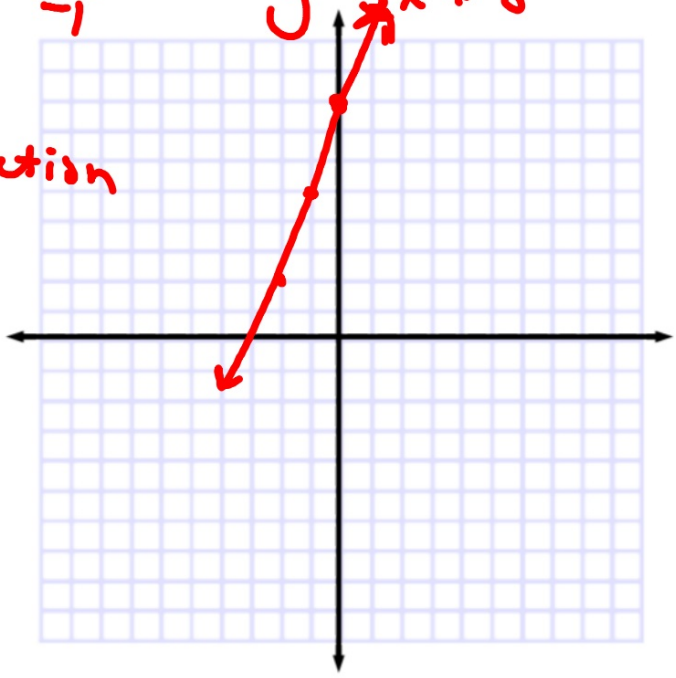
Example 3 Equations as Functions

Determine whether $-3x + y = 8$ is a function.

$+3x \quad +3x$

$y = 3x + 8$

$\frac{-3}{-1} \qquad \frac{3}{1}$



function

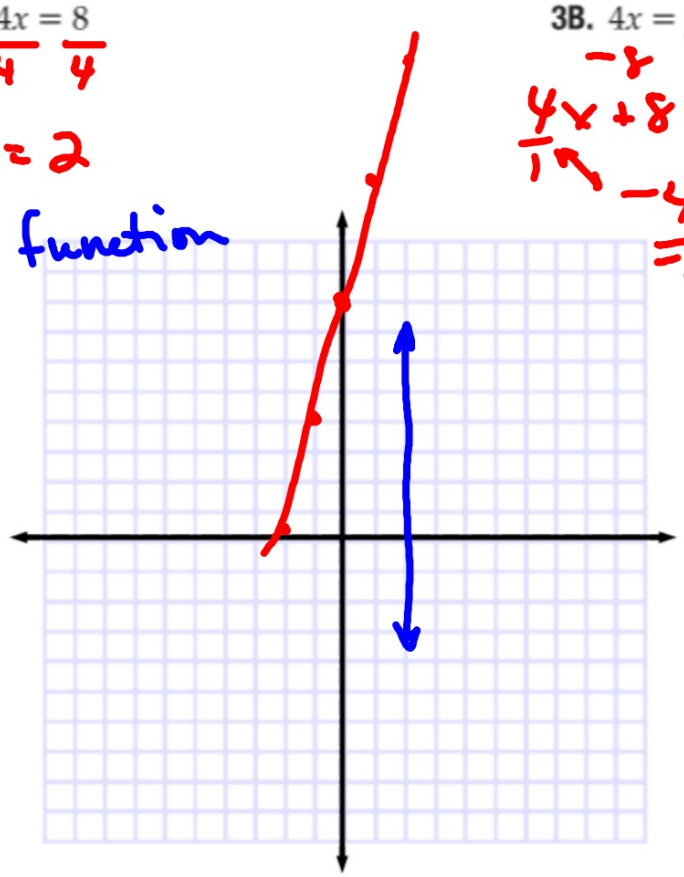
GuidedPractice Determine whether each relation is a function.

3A. $4x = 8$

$\frac{4x}{4} = \frac{8}{4}$

$x = 2$

no function



3B. $4x = y + 8$

$-y \quad -8$

$4x + 8 = y$

$-4x \quad -4x$

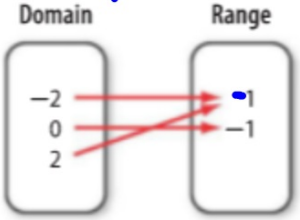
$-1 = -1$

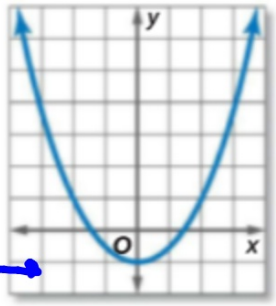
function

ConceptSummary Representations of a Function

Table	Mapping	Equation	Graph
f	f	graph lim	f

x	y
−2	1
0	−1
2	1





ord. pairs

2 Find Function Values

Equations that are functions can be written in a form called **function notation**. For example, consider $y = 3x - 8$.

Equation	Function Notation
$y = 3x - 8$	$f(x) = 3x - 8$

In a function, x represents the elements of the domain, and $f(x)$ represents the elements of the range. The graph of $f(x)$ is the graph of the equation $y = f(x)$. Suppose you want to find the value in the range that corresponds to the element 5 in the domain. This is written $f(5)$ and is read *f of 5*. The value $f(5)$ is found by substituting 5 for x in the equation.

Example 4 Function Values

For $f(x) = -4x + 7$, find each value.

$f(3) = -4 \cdot 3 + 7$
$= -12 + 7$
$= -5$

$f(10) = -4(10) + 7$
$= -40 + 7$
$= -33$

$f(5) = -4 \cdot 5 + 7 = -13$

$f(1) = -4 \cdot 1 + 7$

$f(3) =$

Guided Practice

For $f(x) = 2x - 3$, find each value.

4A. $f(1)$ $= 2 \cdot 1 - 3$
$= 2 + -3$
$= -1$

4B. $6 - f(5)$

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Skills

4C. $f(-2)$ $2(-2) - 3$
$= -4 + -3$
$= -7$

$-4 + -3$

4D. $f(-1) + f(2)$

$f(-4) = 2(-4) - 3$
$= -8 + -3$
$= -11$

$f(-6) = 2(-6) - 3$
$= -12 + -3$
$= -15$