Test 2: Functions and Relations

- Evaluate Functions given equations
- Evaluate Functions from graph
- Relation or Function
- Domain and Range
- Graph Features
- Intervals
- Draw a graph
- Piecewise

Examples (Test is not limited to these examples, but they will help):

Given: $f(x) = \begin{cases} x-3, & when\ x < 6 \\ 2x, & when\ x = 6 \\ 10, & when\ x > 6 \end{cases}$

Evaluate: $f(9)$ $f(2)$ $f(6)$

$= 10$ $= 2-3$ $= 2(6)$

$= -1$ $= 12$

Given: $g(x) = \begin{cases} 1-x, & if\ x \leq 3 \\ 3x+5, & if\ x > 3 \end{cases}$

Evaluate: $g(-5)$ $g(0)$ $g(3)$ $g(5)$

$= 1-(-5)$ $= 1-0$ $= 1-3$ $= 3(5)+5$

$= 6$ $= 1$ $= -2$ $= 20$

Identify the range of the function $f(x) = 2x - 4$, given the domain D: $\{0, 1, 4\}$

$f(0) = 2(0) - 4 = -4$

$f(1) = 2(1) - 4 = -2$

$f(4) = 2(4) - 4 = 4$

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

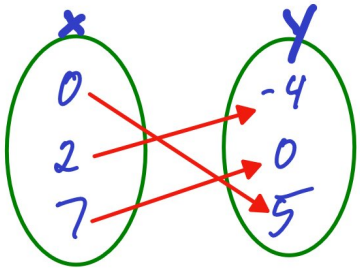
Determine the domain, range, whether it is a function, and then draw a mapping diagram.

$\{(0, 5), (2, -4), (7, 0)\}$

D: {0, 2, 7}

R: {-4, 0, 5}

Function

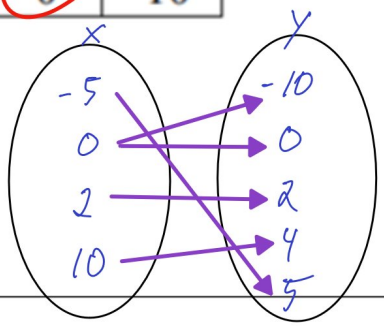


x	y
10	4
2	2
-5	5
0	0
0	-10

D: {-5, 0, 2, 10}

R: {-10, 0, 2, 4, 5}

Not a Function



Given $f(x) = 2x + 4$, if the output is 12, what was the input?

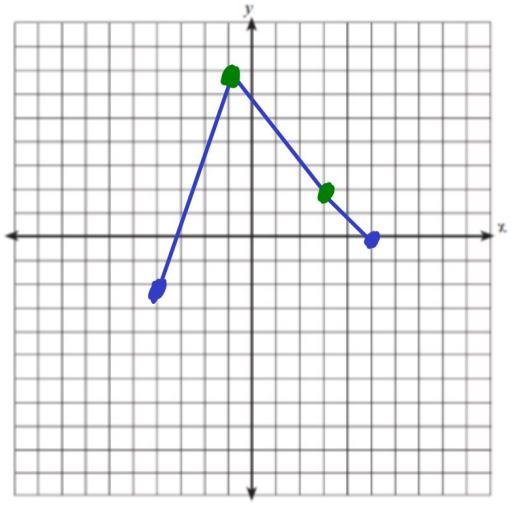
$2x + 4 = 12$

$-4 \quad -4$

$\frac{2}{2}x = \frac{8}{2}$

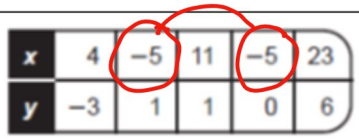
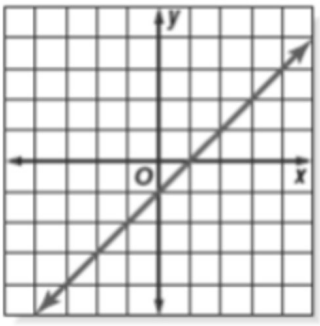
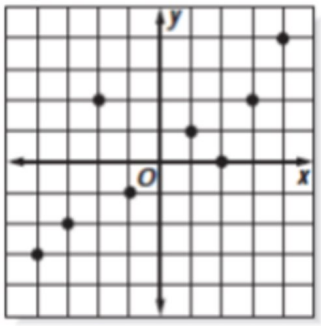
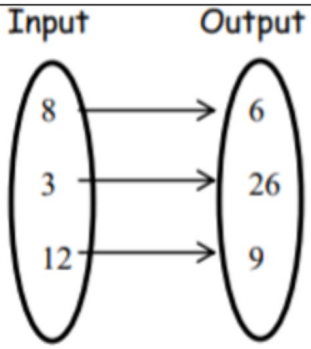
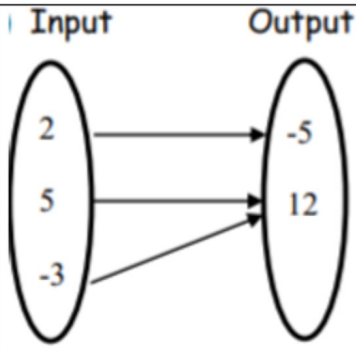
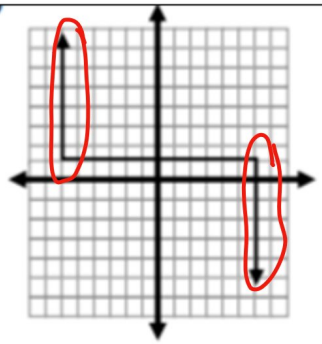
$x = 4$

Draw a graph with a domain of $-4 \leq x \leq 5$, a range of $-2 \leq y \leq 7$, contains $f(3) = 2$, has an absolute maximum when $x = -1$, has a relative minimum when $x = 5$



your graph may vary. Green points are required.

Determine if the following relations are functions. If not, explain.

{(4, -5), (0, -9), (1, 0), (7, 0)} Function	{(-2, -5), (4, 9), (1, 10), (-2, 4)} Not a Function	{(4, -5), (0, -5), (11, 30), (17, 10)} Function
 Not a Function	 Function	 Function
 Function	 Function	 Not a Function

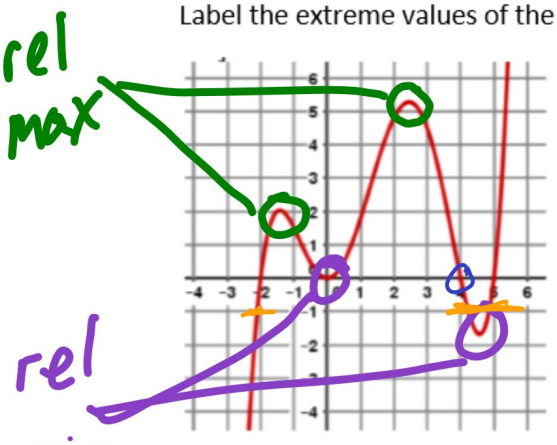
Given the following functions:

$f(x) = 4x - 7$ $g(x) = -9x$ $h(x) = \frac{24}{x}$ $j(x) = x^2 + 2$

Evaluate and Simplify

$f(-6)$	$g(-8)$	$f(5b-2)$
$4(-6) - 7$ -31	72	$4(5b-2) - 7$ $20b - 15$
$h(2) + g(10)$	$j(-5)$	$8 \cdot h(4)$
$\frac{24}{2} + -9(10)$ $12 - 90 = -78$	$(-5)^2 + 2$ 27	$8 \cdot \left(\frac{24}{4}\right)$ $8 \cdot 6 = 48$
$j(w) + f(w+1)$ $w^2+2 + 4(w+1) - 7$ $w^2 + 2 + 4w + 4 - 7$ $w^2 + 4w - 1$	$g(f(0))$ $f(0) = 4(0) - 7 = -7$ $g(-7) = -9(-7)$ $= 63$	$h(j(2))$ $j(2) = 2^2 + 2 = 6$ $h(6) = \frac{24}{6} = 4$

Label the extreme values of the following graph (assume arrows at the ends)



When is the graph positive?

$-2 < x < 4$ and $x > 5$

What are the x-intercepts?

$-2, 0, 4, 5$

What is $f(4)$?

0

How many solutions of $f(k) = -1$ are there? 3

Describe the end behavior:

As x increases, y increases

x decreases, y decreases.

D: $\mathbb{R}$

R: $\mathbb{R}$