

Functions (2.1)

Math 98

Functions are used to show a relationship between two quantities. We will represent functions with words, tables, symbols, and graphs. Not all relationships can be considered functions however.

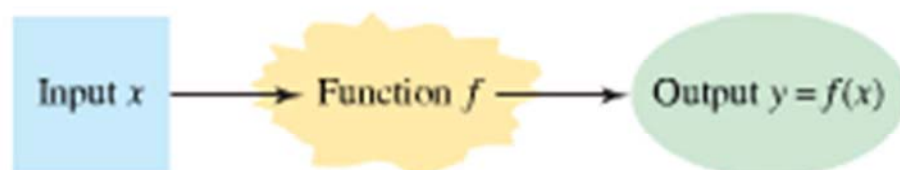
Function – a relationship between two sets of quantities, where

The Input –

The Output –

Function Notation –

A picture:



Wages Example –

1. Is it a Function?

a) Input \$1 to Quarter (25¢) Change Machine (what's the output?)

vs.

Input \$1 into Slot Machine (what's the output?)

b)

Input – Baseball Team	Output – Baseball City

c)

Input – Baseball City	Output – Baseball Team

We need to be able to:

- Decide if a relationship is a function
- Evaluate a function
- Determine what numbers or values are allowed as inputs (Domain)
- Determine what numbers or values can result as outputs (Range)

2. For each of the examples in the table below, state whether the table, graph, or words do or do not describe a functional relationship. If it does not, provide an explanation or circle the features you used to make your decision.

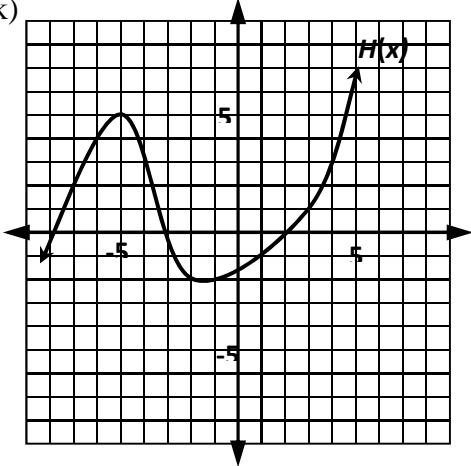
Tables	Graphs	Words												
<p>a)</p> <table border="1"> <thead> <tr> <th>t</th> <th>C</th> </tr> </thead> <tbody> <tr><td>1</td><td>1</td></tr> <tr><td>2</td><td>4</td></tr> <tr><td>3</td><td>9</td></tr> <tr><td>4</td><td>16</td></tr> <tr><td>5</td><td>25</td></tr> </tbody> </table> <p>Is C a function of t?</p>	t	C	1	1	2	4	3	9	4	16	5	25	<p>b)</p>	<p>c) Is the amount you pay your babysitter for an evening out a function of the time you are gone if she charges \$6 an hour?</p>
t	C													
1	1													
2	4													
3	9													
4	16													
5	25													
<p>d)</p> <table border="1"> <thead> <tr> <th>t</th> <th>C</th> </tr> </thead> <tbody> <tr><td>15</td><td>100</td></tr> <tr><td>30</td><td>200</td></tr> <tr><td>45</td><td>100</td></tr> <tr><td>0</td><td>150</td></tr> <tr><td>15</td><td>100</td></tr> </tbody> </table> <p>Is C a function of t?</p>	t	C	15	100	30	200	45	100	0	150	15	100	<p>e)</p> <p>Does this graph show y as a function of x?</p>	<p>f) Is the amount you are charged in sales tax a function of the cost of a taxable item purchased in Seattle?</p>
t	C													
15	100													
30	200													
45	100													
0	150													
15	100													
<p>g)</p> <table border="1"> <thead> <tr> <th>y</th> <th>x</th> </tr> </thead> <tbody> <tr><td>-3</td><td>5</td></tr> <tr><td>-2</td><td>6</td></tr> <tr><td>0</td><td>7</td></tr> <tr><td>-3</td><td>8</td></tr> <tr><td>1</td><td>9</td></tr> </tbody> </table> <p>Is x a function of y?</p> <p>Is y a function of x?</p>	y	x	-3	5	-2	6	0	7	-3	8	1	9	<p>h)</p> <p>Does this graph show y as a function of x?</p>	<p>i) Is the amount you are charged in federal income taxes a function of the amount you earn?</p>
y	x													
-3	5													
-2	6													
0	7													
-3	8													
1	9													

Vertical Line Test –

Evaluating Functions - The first step is being able to read and interpret the symbols in the name of a function.

$$f(x)$$

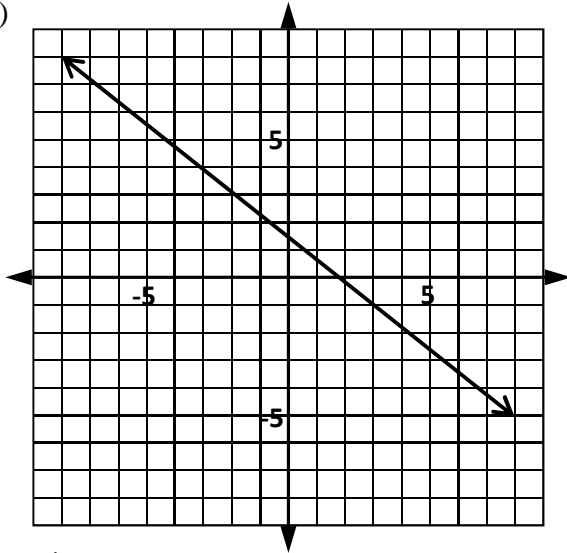
3. In the following examples, use the tables, graphs, and symbols to evaluate the given functions.

Tables	Graphs	Symbols												
<p>j)</p> <table border="1"> <thead> <tr> <th>n</th> <th>$p(n)$</th> </tr> </thead> <tbody> <tr> <td>6</td> <td>21</td> </tr> <tr> <td>-1</td> <td>6</td> </tr> <tr> <td>2</td> <td>13.5</td> </tr> <tr> <td>0</td> <td>9</td> </tr> <tr> <td>-4</td> <td>-1</td> </tr> </tbody> </table> <ul style="list-style-type: none"> • Compute $p(0)$ • Find $p(-1)$ • Find n such that $p(n)=13.5$ 	n	$p(n)$	6	21	-1	6	2	13.5	0	9	-4	-1	<p>k)</p>  <ul style="list-style-type: none"> • Compute $H(1)$ • What is $H(-7)$ • For what values of x is $H(x)=5$ 	<p>l) If $f(r) = 2 + 7r - r^2$,</p> <ul style="list-style-type: none"> • Compute $f(3)$ • Evaluate $f(r)$ at $r = 8$ • Find $f(-2)$
n	$p(n)$													
6	21													
-1	6													
2	13.5													
0	9													
-4	-1													

Identifying domains and ranges of various functions

4. Determine the domain and range of each of the following functions. Write your answers using interval notation.

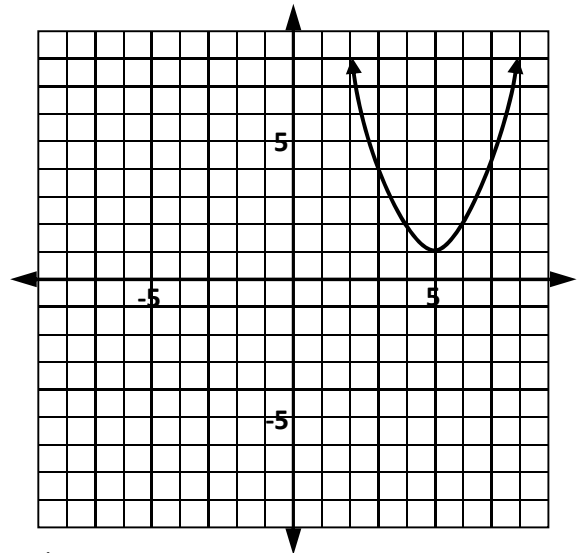
m)



Domain:

Range:

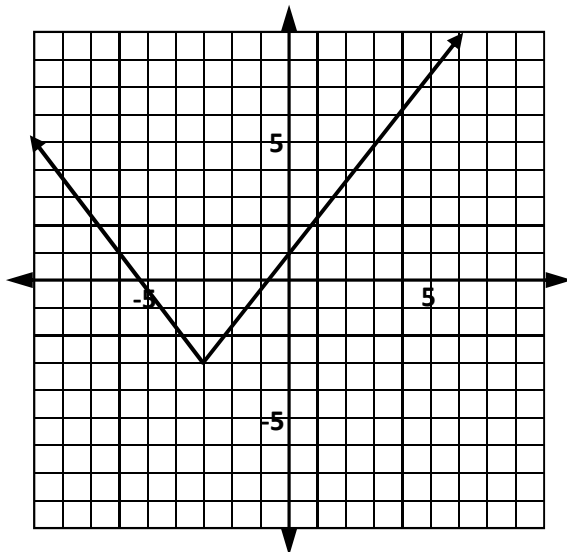
n)



Domain:

Range:

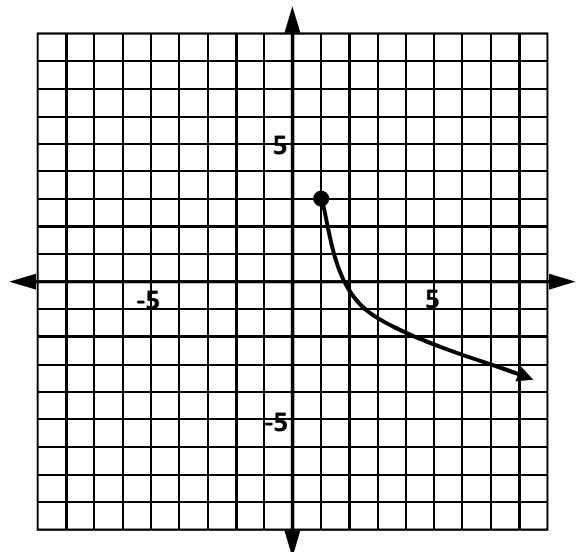
o)



Domain:

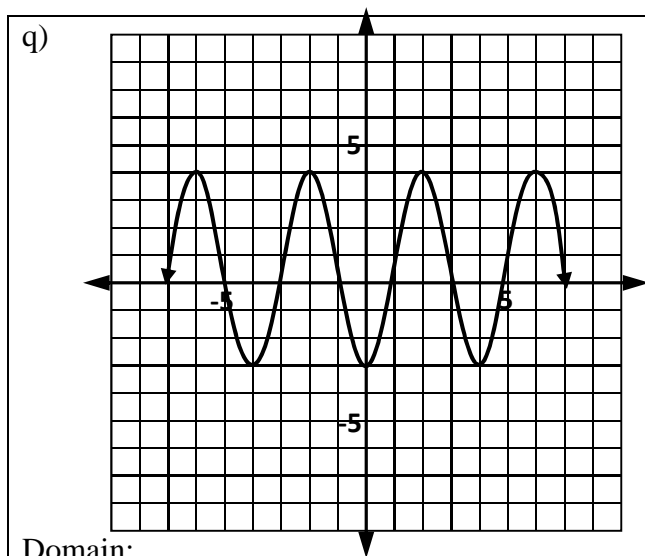
Range:

p)



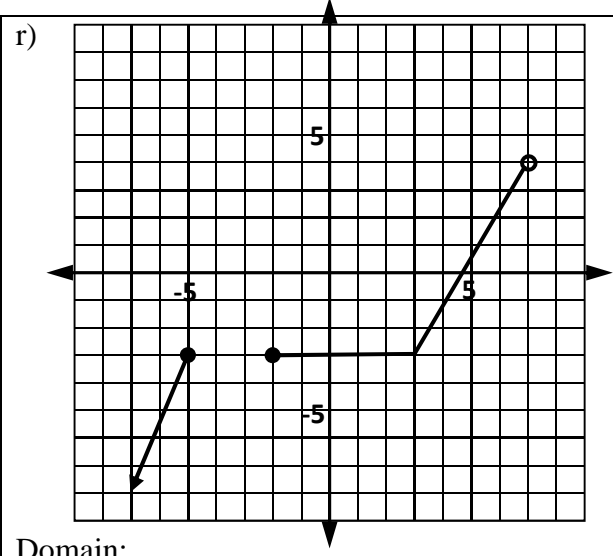
Domain:

Range:



Domain:

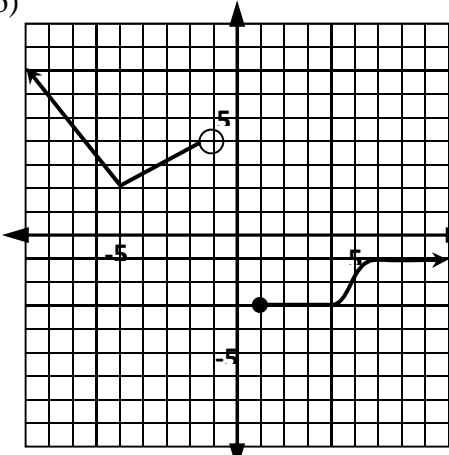
Range:



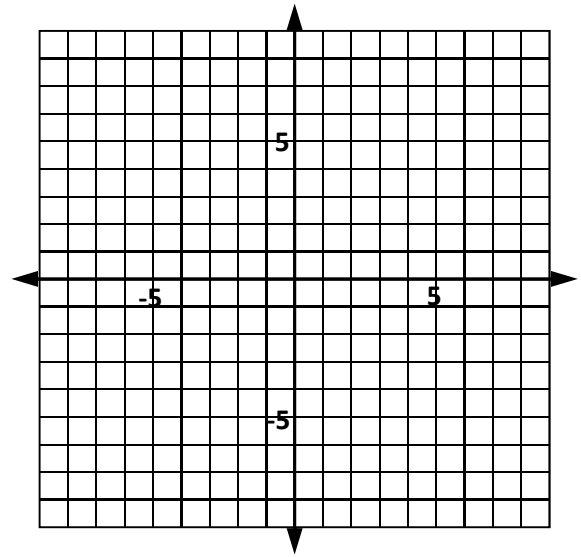
Domain:

Range:

5. Determine the domain and range of functions given in tables, graphs, and symbols to evaluate the given functions.

Tables	Graphs	Symbols												
<p>a)</p> <table border="1"> <thead> <tr> <th>h</th> <th>W</th> </tr> </thead> <tbody> <tr> <td>37</td> <td>592</td> </tr> <tr> <td>42</td> <td>672</td> </tr> <tr> <td>37</td> <td>592</td> </tr> <tr> <td>35</td> <td>560</td> </tr> <tr> <td>48</td> <td>768</td> </tr> </tbody> </table> <p>For the function $W(h)$, use set notation to list its</p> <p>Domain:</p> <p>Range:</p>	h	W	37	592	42	672	37	592	35	560	48	768	<p>b)</p>  <p>For the function $f(x)$ shown above, use interval notation to describe its</p> <p>Domain:</p> <p>Range:</p>	<p>c) For the function $r(x) = \frac{8}{x(x-3)}$, use interval notation to describe its</p> <p>Domain:</p> <p>Range:</p>
h	W													
37	592													
42	672													
37	592													
35	560													
48	768													

A **ZERO** of a function means that:



6. Find the zeros of functions.

a) $f(x) = 3x - 7$

