Introduction to Functions

What is a function?

It is a rule that will give **one and only one possible answer (y)** for any x value that is input into the rule.

Function Notation:

Instead of y we use *f(x)* or *g(x)* or *h(x)* etc

This is pronounce *f of x* or *g of x* or *h of x*....

Let's look at an example of a linear function: a rule that will make a straight line

f(x) = 2x + 8 this could also be written *y = 2x + 8*

Function notation allows us to ask a question using as few words as possible

Example: f(3)=?

(The question is asking us to plug 3 in for x and then solve for y...)

f(x) = 2x + 8 y = ax+b

f(3) = 2(3) + 8 f(x) = ax+b

= 6 + 8

= 14

f(5) = 18 = 2(5) +8

f(10) = 28 = 2(10) +8

f(0) = 8 = 2(0) +8

f(-2) = 4 = 2(-2) +8

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Think of the rule as a program: x is the input and y is the output

Example 2: g(x) = -3x +10

	Input x	Rule g(x) = -3x+10	Output y
g(3)	3	-3(3)+10	1
g(2)	2	-3(2)+10	4
g(1)	1	-3(1)+10	7
g(0)	0	-3(0)+10	10
g(-1)	-1	-3(-1)+10	13
g(-2)	-2	-3(-2)+10	16
g(-3)	-3	-3(-3)+10	19
g(-11)	-11	-3(-11)+10	43

3
3
3
3

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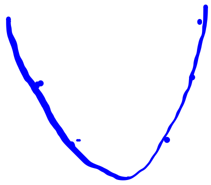
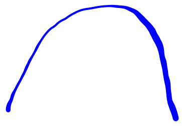
Example 3 $h(x) = 4x^2$ Quadratic

	Input x	Rule $h(x) = 4x^2$	Output y
h(3)	3	$4(3)^2$	36
h(2)	2	$4(2)^2$	16
h(1)	1	$4(1)^2$	4
h(0)	0	$4(0)^2$	0
h(-1)	-1	$4(-1)^2$	4
h(-2)	-2	$4(-2)^2$	16
h(-3)	-3	$4(-3)^2$	36





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When we create a table for the function we can use the x (input) and y (output) together as pairs and use them to graph the function.

Create a table for the given rules. Choose values for x, input the value into the rule to determine the y.

Plot the pairs of coordinates and draw a line to represent the function.

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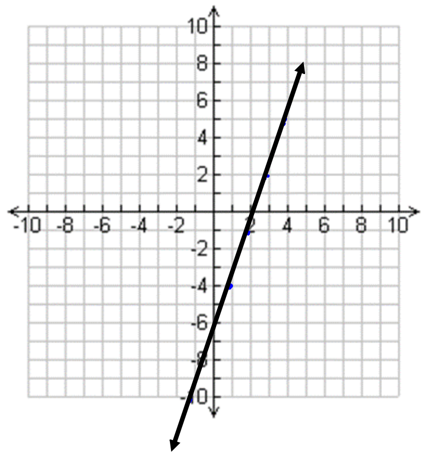
1) f(x) = 3x-7

Input x	Rule 3x-7	Output y
f(-2)	3(-2) -7	-13
f(3)	3(3) -7	2
f(2)	3(2) - 7	-1
f(1)	3(1) - 7	-4
f(-1)	3(-1) - 7	-10
f(4)	3(4) - 7	5



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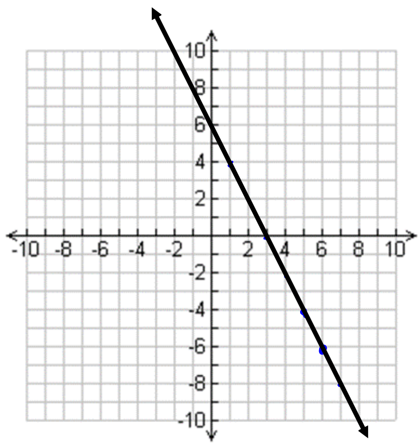
2) g(x) = -2x + 6

Input x	Rule	Output y
g(3)	-2(3) + 6	0
g(1)	-2(1)+6	4
g(7)	-2(7) +6	-8
g(4)	-2(4)+6	-2
g(6)	-2(6) +6	-6
g(5)	-2(5) +6	-4



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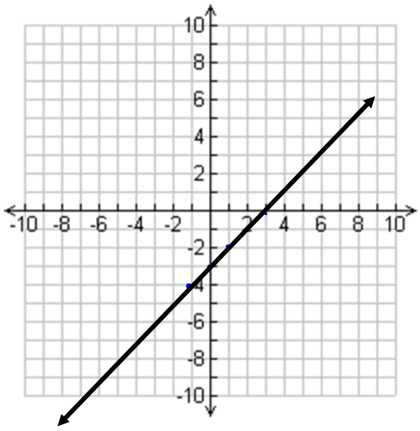
3) $f(x) = x - 3$

Input x	Rule	Output y
$f(3)$	$(3)-3$	0
$f(2)$	$(2)-3$	-1
$f(1)$	$(1)-3$	-2
$f(0)$	$(0)-3$	-3
$f(-1)$	$(-1)-3$	-4
$f(-2)$	$(-2)-3$	-5



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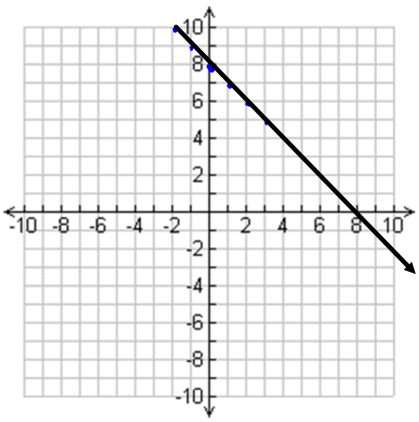
4) $g(x) = -x + 8 = -1x + 8$

Input x	Rule	Output y
$g(-2)$	$-(-2)+8$	10
$g(-1)$	$-(-1)+8$	9
$g(0)$	$-(0)+8$	8
$g(1)$	$-(1)+8$	7
$g(2)$	$-(2)+8$	6
$g(3)$	$-(3)+8$	5



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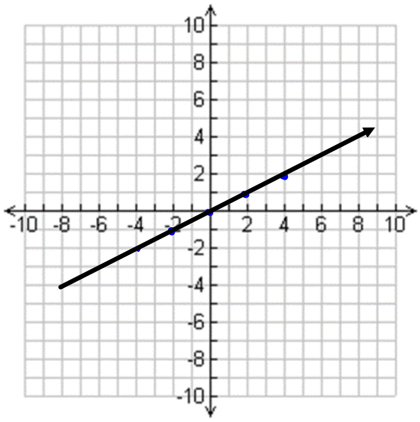
5) $f(x) = 0.5\,x = \frac{1}{2}x$

Multiples

Input x	Rule	Output y
$f(-4)$	$0.5(-4)$	-2
$f(-2)$	$0.5(-2)$	-1
$f(0)$	$0.5(0)$	0
$f(2)$	$0.5(2)$	1
$f(4)$	$0.5(4)$	2



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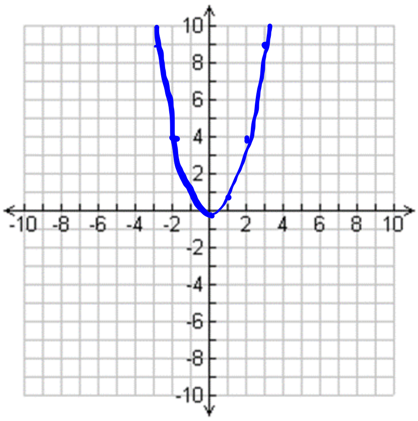
6) $h(x) = (x^2)$

Input x	Rule	Output y
-3	$(-3)^2$	9
-2	$(-2)^2$	4
-1	$(-1)^2$	1
0	0^2	0
1	$(1)^2$	1
2	$(2)^2$	4
3	$(3)^2$	9



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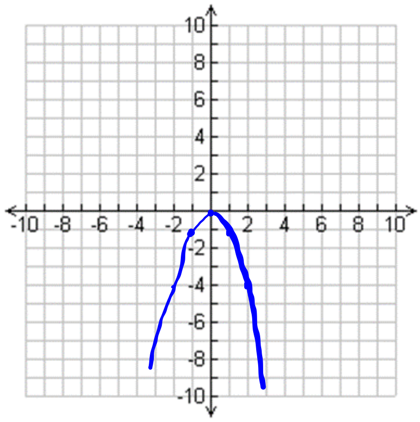
7) $g(x) = -(x^2)$ $= -1(x^2)$

Input x	Rule	Output y
-2	$-(-2)^2$	-4
-1	$-(-1)^2$	-1
0	$-(0)^2$	0
1	$-(1)^2$	-1
2	$-(2)^2$	-4



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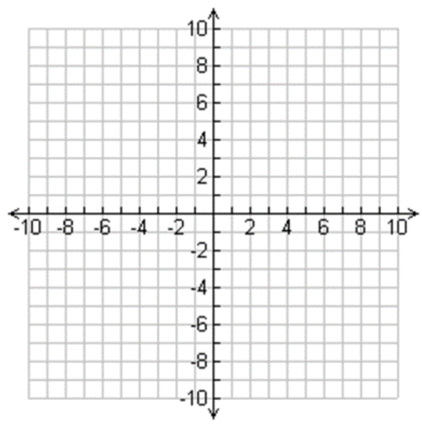
8) $h(x) = 0.5(x^2)$

Input x	Rule	Output y
-4		
-2		
-1		
0		
1		
2		
-4		



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Homework

Textbook #2

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