Function Notation

When a function can be written as an equation, the symbol f(x) replaces y and is read as "the value of f at x" or simply "f of x."

REMEMBER***

f(-3) means -3 is your input and you plug it in for x

f(x) = -3 means that your whole function is = to -3 and you plug into the y.

This does NOT mean f times x.

Replacing y with f(x) is called writing a function in **function notation**.

Examples:

If $f(x) = 2x - 3$, find the following:

a. f(-2)

b. f(7)

c. f(-4)

If $k(x) = -7x + 1$, find the following:

d. k(0)

e. k(-1)

f. k(5)

Sometimes, there will be multiple x's in an equation. When this occurs, simply replace both values of x.

If $h(x) = x^2 - 3x + 5$, find the following:

a. h(-3)

b. h(5)

If $p(x) = x^2 + 5x - 3$, find the following:

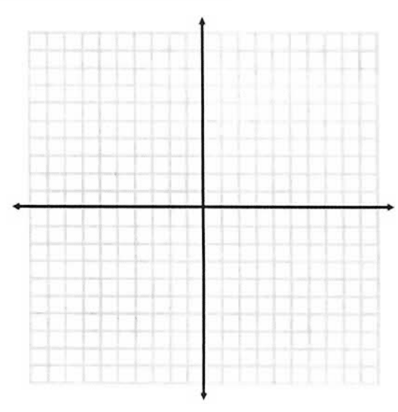
c. p(-2)

d. p(1)

If $f(x) = 5x - 3$, fill out the following table of values:

x	-2	-1	0	1	2	3
f(x)						

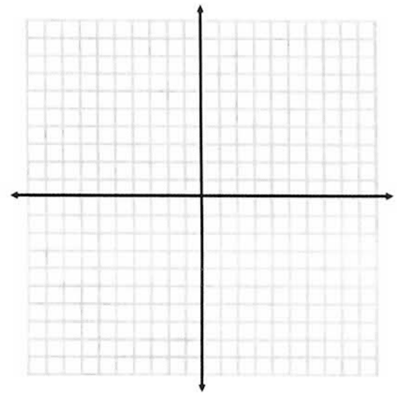
What type of function is this?



If $f(x) = 2^x + 5$, fill out the following table of values:

x	-2	-1	0	1	2	3
f(x)						

What type of function is this?



Using the table of values, find the following:

x	0	9	8	-3	2	-5	20
f(x)	-1	4	4	2	9	8	0

a. f(-3)

b. f(20)

c. f(8)

d. f(-1)

e. If f(x) = 9, what is x?

f. If f(x) = 4, what is x?

g. If f(x) = 0, what is x?

h. If f(x) = -5, what is x?

Sometimes, instead of finding the value of the function at a given x-value, you will be given the value of the function and asked to find the value of x. In these cases, replace the function notation and solve rather than the x. (Use the functions defined in the above examples.)

a. Let $f(x) = 2x - 3$. If $f(x) = 15$, find x.

b. Let $g(x) = 3x + 2$. If $g(x) = 11$, find x.

c. Let $w(x) = 3x - 7$. If $w(x) = 14$, find x.

d. Let $h(x) = -2x - 5$. If $h(x) = -25$, find x.

Algebra I
Function Notation Worksheet

Name: ______________________________
Hour: __________ Date: _______________

1. Evaluate the following expressions given the functions below:

$g(x) = -3x + 1$ $f(x) = x^2 + 7$ $h(x) = \frac{12}{x}$ $j(x) = 2x + 9$

a. $g(10) =$

b. $f(3) =$

c. $h(-2) =$

d. $j(7) =$

e. $h(a)$

f. Find x if $g(x) = 16$

g. Find x if $h(x) = -2$

h. Find x if $f(x) = 23$

i. CHALLENGE! (in other words, optional) $g(b+c)$

j. CHALLENGE! (also optional) $f(h(x))$

2. Translate the following statements into coordinate points:

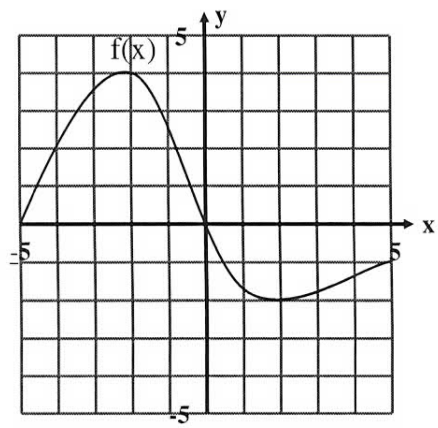
a. $f(-1) = 1$

b. $h(2) = 7$

c. $g(1) = -1$

d. k(3) = 9

3. Given this graph of the function f(x):



Find:

a. f(–4) = **b.** f(0) = **c.** f(3) **d.** f(-5)

e. x when f(x) = 2 **f.** x when f(x) = 0

Functional Function: F of x it is!

Functional notation is a way of representing functions algebraically. Function notation makes it easier to recognize the independent and dependent variables in an equation.

The function $f(x)$ is read as "f of x" and indicates that x is the independent variable. Consider the equation $c = 8s + 15$, where the independent variable s represents the number of shirts ordered and the dependent variable c represents the cost of the order. The equation can be written using functional notation as $f(s) = 8s + 15$. The cost, defined by f, is a function of s, the number of shirts ordered.

The process of calculating the value of a function for a specific value of the independent variable is called **evaluating a function.**
For example, the cost of ordering 4 shirts can be calculated by evaluating the function at $s = 4$.

This is written as $f(4)$ and read as "f of 4."

To evaluate, substitute 4 for s in the rule $f(s)$ _ $8s$ _ 15.
$f(4) = 8(4) + 15 = 32 + 15 = 47$
$f(4) = 47$

Problem 1 Functions as Equations

1. The function $f(s) = 8s + 15$ represents the cost of ordering s shirts. What are the domain and range of the function?

2. Use the equation $f(s) = 8s + 15$ to evaluate the function at each value. Explain what each means in terms of the problem.

a. $f(7)$ **b.** $f(100)$ **c.** $f(11)$

d. $f(0)$ **e.** $f(2.5)$

3. Calculate the value of x that makes each equation true. Explain what each means in terms of the problem.

a. $f(x) = 55$ **b.** $f(x) = 175$ **c.** $f(x) = 151$

REMEMBER***
f(-3) means -3 is your input and you plug it in for x

f(x) = -3 means that your whole function is = to -3 and you plug into the y.

Problem 2 Functions as Tables

The function $h(a)$ represents the average height of boys that are a years old.

Boy's Age	Average Height in Inches
6 months	26
12 months	30
18 months	34
2 years	36
3 years	39
4 years	42
5 years	44
6 years	47
7 years	49
8 years	51
9 years	53
10 years	55
11 years	57
12 years	59
13 years	61

1. Use the table to evaluate the function at each value. Explain what each means in terms of the problem.

   a. $h(7)$

   b. $h(1.5)$

   c. $h(11)$

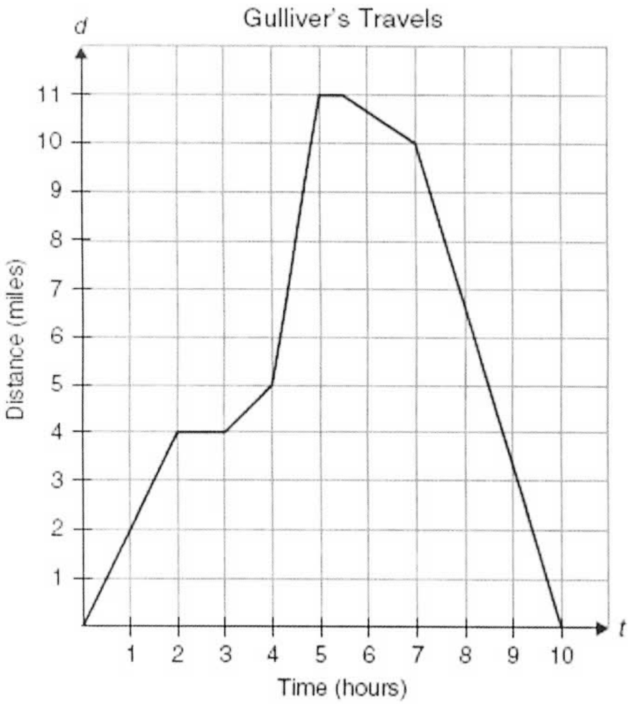
   d. $h(12.5)$

2. Calculate the value of a that makes each equation true. Explain what each means in terms of the problem.

   a. $h(a) = 61$ **b.** $h(a) = 36$

   c. $h(a) = 53$ **d.** $h(a) = 45$

Problem 3 Functions as Graphs



The function $d(t)$ represents Gulliver's distance from home after t hours.

1. Use the graph to evaluate the function at each value. Explain what each means in terms of the problem.

   a. $d(2)$ **b.** $d(5)$

   c. $d(2.9)$ **d.** $d(10)$

2. Calculate the value of t that makes each equation true. Explain what each means in terms the problem.

   a. $d(t) = 2$ **b.** $d(t) = 5$

   c. $d(t) = 4$ **d.** $d(t) = 0$

Algebra I
Function Notation Worksheet

Name: ____________________
Hour: ________ Date: ____________

1. Evaluate the following expressions given the functions below:

$g(x) = -3x + 1$ $f(x) = x^2 + 7$ $h(x) = \frac{12}{x}$ $j(x) = 2x + 9$

a. $g(10) =$ $-3(10) + 1 = -29$

b. $f(3) =$ $3^2 + 7 = 16$

c. $h(-2) =$ $\frac{12}{-2} = -6$

d. $j(7) =$ $14 + 9 = 23$

e. $h(a)$ $= \frac{12}{a}$

f. Find x if $g(x) = 16$ $16 = -3x + 1$ -1 -1 $\frac{-3x}{-3} = \frac{-15}{-3}$ $x = 5$

g. Find x if $h(x) = -2$ $x \cdot -2 = \frac{12}{x} \cdot x$ $-2x = 12$ $x = -6$

E.C. **h.** Find x if $f(x) = 23$ $23 = x^2 + 7$ -7 -7 $x^2 = 16$ $x = \pm 4$

i. CHALLENGE! (in other words, optional) $g(b+c)$ $= -3(b+c) + 1 =$ $-3b - 3c + 1$

j. CHALLENGE! (also optional) $f(h(x))$ $= \left(\frac{12}{x}\right)^2 = \frac{144}{x^2}$

2. Translate the following statements into coordinate points:

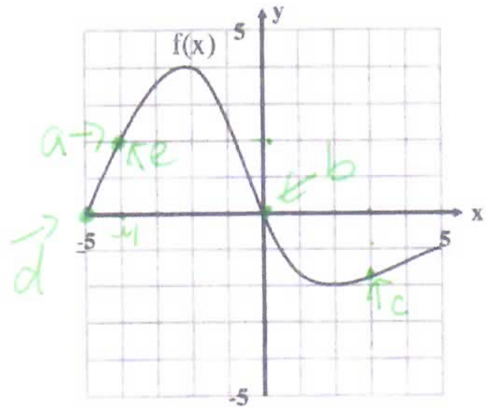
a. $f(-1) = 1$ ~~[illegible]~~ $-1, 1$

b. $h(2) = 7$ $2, 7$

c. $g(1) = -1$ $1, -1$

d. k(3) = 9

3. Given this graph of the function f(x):



Find:

a. f(–4) = 2 **b.** f(0) = 0 **c.** f(3) ≈ -1.8 **d.** f(-5) = 0

e. x when f(x) = 2
-4

f. x when f(x) = 0
0

Function Notation

When a function can be written as an equation, the symbol f(x) replaces y and is read as "the value of f at x" or simply "f of x."

> **REMEMBER*****
>
> **f(-3) means -3 is your input and you plug it in for x**
>
> **f(x) = -3 means that your whole function is = to -3 and you plug into the y.**

This does NOT mean f times x.

Replacing y with f(x) is called writing a function in **function notation**.

Examples:

If f(x) = 2x – 3, find the following:

a. f(-2) $2(-2)-3=-4-3=-7$

b. f(7) $2(7)-3=14-3=11$

c. f(-4) $2(-4)-3$ $-8-3=-11$

If k(x) = -7x + 1, find the following:

d. k(0) $-7(0)+1=1$

e. k(-1) $(-7)(-1)+1=7+1=8$

f. k(5) $-7(5)+1$ $-35+1$ -34

Sometimes, there will be multiple x's in an equation. When this occurs, simply replace both values of x.

If h(x) = x^2 – 3x + 5, find the following:

a. h(-3) $(-3)^2-3(-2)+5$ $9+6+5$ 20

b. h(5) $(5)^2-3(5)+5$ $25-15+5$ $10+5$ 15

If p(x) = x^2 + 5x – 3, find the following:

c. p(-2) $(-2)^2+5(-2)-3$ $4-10-3$ -9

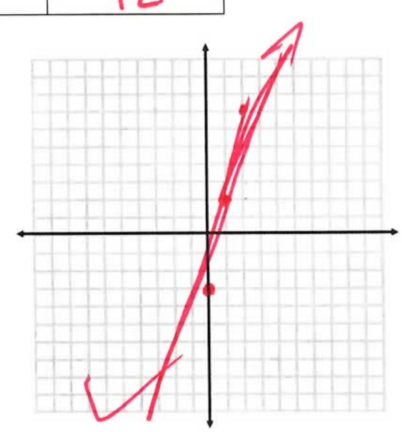
d. p(1) $(1)^2+5(1)-3)$ $1+5-3$ 3

If f(x) = 5x - 3, fill out the following table of values:

x	-2	-1	0	1	2	3
f(x)	-13	-8	-3	2	7	12

What type of function is this?

LINEAR



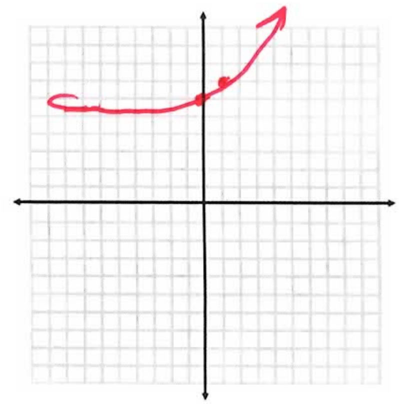
If $f(x) = 2^x + 5$, fill out the following table of values:

x	-2	-1	0	1	2	3
f(x)	5 1/4	5 1/2	6	7	9	

What type of function is this?

SKIP FOR NOW

Exponent



Using the table of values, find the following:

x	0	9	8	-3	2	-5	20
f(x)	-1	4	4	2	9	8	0

a. f(-3) = 2

b. f(20) 0

c. f(8) 4

d. f(-1) CANNOT FIND ON TABLE BETWEEN 9 & 8

e. If f(x) = 9, what is x? 2

f. If f(x) = 4, what is x? 9 or 8

g. If f(x) = 0, what is x? 20

h. If f(x) = -5, what is x? NOT KNOWN BY TABLE

Sometimes, instead of finding the value of the function at a given x-value, you will be given the value of the function and asked to find the value of x. In these cases, replace the function notation and solve rather than the x. (Use the functions defined in the above examples.)

a. Let $f(x) = 2x - 3$. If $f(x) = 15$, find x.

$15 = 2x - 3$
$+3 \quad +3$
$18 = 2x$
$x = 9$

b. Let $g(x) = 3x + 2$. If $g(x) = 11$, find x.

$11 = 3x + 2$
$-2 \quad -2$
$9 = 3x$
$x = 3$

c. Let $w(x) = 3x - 7$. If $w(x) = 14$, find x.

$14 = 3x - 7$
$+7 \quad +7$
$3x = 21$
$x = 3$

d. Let $h(x) = -2x - 5$. If $h(x) = -25$, find x.

$-25 = -2x - 5$
$+5 \quad +5$
$-20 = -2x$
$\frac{-20}{-2} = \frac{-2x}{-2}$
$x = 10$

Functional Function: F of x it is!

Functional notation is a way of representing functions algebraically. Function notation makes it easier to recognize the independent and dependent variables in an equation.

The function $f(x)$ is read as "f of x" and indicates that x is the independent variable. Consider the equation $c = 8s + 15$, where the independent variable s represents the number of shirts ordered and the dependent variable c represents the cost of the order. The equation can be written using functional notation as $f(s) = 8s + 15$. The cost, defined by f, is a function of s, the number of shirts ordered.

The process of calculating the value of a function for a specific value of the independent variable is called **evaluating a function.**
For example, the cost of ordering 4 shirts can be calculated by evaluating the function at $s = 4$.

This is written as $f(4)$ and read as "f of 4."

To evaluate, substitute 4 for s in the rule $f(s)$ _ $8s$ _ 15.
$f(4) = 8(4) + 15 = 32 + 15 = 47$
$f(4) = 47$

Problem 1 Functions as Equations

1. The function $f(s) = 8s + 15$ represents the cost of ordering s shirts. What are the domain and range of the function? Domain # of shirts

Range Total costs

2. Use the equation $f(s) = 8s + 15$ to evaluate the function at each value. Explain what each means in terms of the problem.

a. $f(7)$ $8(7)+15=$ $56+15$ 71

b. $f(100)$ 815

c. $f(11)$ 103

NOT → **d.** $f(0)$ 15

e. $f(2.5)$ Is this likely? (35)

3. Calculate the value of x that makes each equation true. Explain what each means in terms of the problem.

a. $f(x) = 55$

$55 = 8s + 15$
$-15 \quad -15$
$40 = 8s$
$s = 5$

b. $f(x) = 175$

$175 = 8s + 15$
$-15 \quad -15$
$160 = 8s$
$s = 20$

c. $f(x) = 151$

$151 = 8s + 15$
$-15 \quad -15$
$136 = 8s$
$\frac{136}{8} \quad \frac{8s}{8}$
$s = 17$

REMEMBER***
f(-3) means -3 is your input and you plug it in for x

f(x) = -3 means that your whole function is = to -3 and you plug into the y.

Problem 2 Functions as Tables

The function $h(a)$ represents the average height of boys that are a years old.

Boy's Age	Average Height in Inches
6 months	26
12 months	30
18 months	34
2 years	36
3 years	39
4 years	42
5 years	44
6 years	47
7 years	49
8 years	51
9 years	53
10 years	55
11 years	57
12 years	59
13 years	61

1. Use the table to evaluate the function at each value. Explain what each means in terms of the problem.

   a. $h(7)$ = 49

   b. $h(1.5)$ 34

   c. $h(11)$ 57

   d. $h(12.5)$ 60

2. Calculate the value of a that makes each equation true. Explain what each means in terms of the problem.

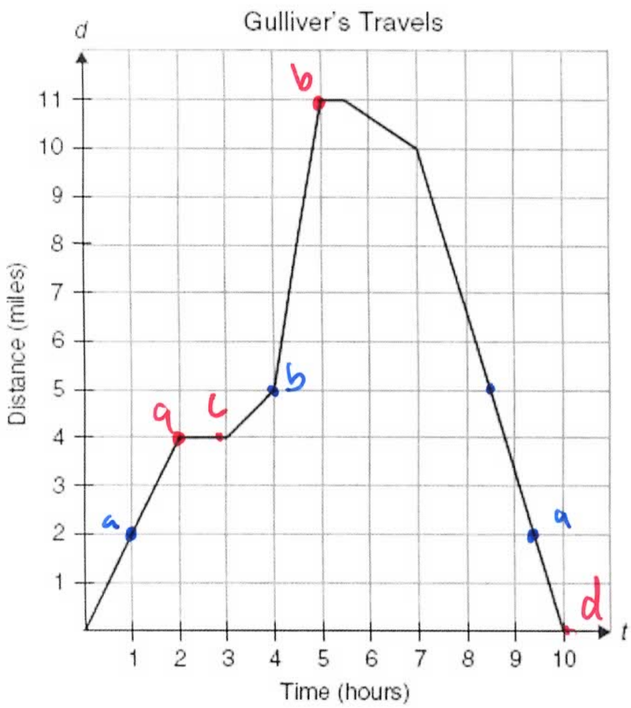
   a. $h(a) = 61$ 13yrs

   b. $h(a) = 36$ 2yrs

   c. $h(a) = 53$ 9yrs

   d. $h(a) = 45$ 5–6yrs

Problem 3 Functions as Graphs



The function $d(t)$ represents Gulliver's distance from home after t hours.

1. Use the graph to evaluate the function at each value. Explain what each means in terms of the problem.

   a. $d(2)$ 4

   b. $d(5)$ 11

   c. $d(2.9)$ 4

   d. $d(10)$ 0

2. Calculate the value of t that makes each equation true. Explain what each means in terms the problem.

   a. $d(t) = 2$ 1, 9.4

   b. $d(t) = 5$ 4, 8.5

   c. $d(t) = 4$ [illegible]

   d. $d(t) = 0$ 0, 10