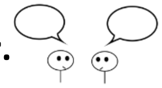
Unit 10 – Function Notation

Let's work together.



1. Given the function ***g*** defined by ***g*(x) = x² – 4**, find the following:

(a) $g(-3)$

$g(-3) = (-3)^2 - 4$
$= 9 - 4$
$= 5$
$\mathbf{g(-3) = 5}$ $(-3, 5)$

(b) $g(0)$

$g(0) = (0)^2 - 4$
$= 0 - 4$
$= -4$
$\mathbf{g(0) = -4}$ $(0, -4)$

2. Using the function rule $\mathbf{h(x) = 15 - \frac{3}{2}x}$, find the value of x when $h(x) = 24$.

Replace $h(x)$ with 24

$24 = 15 - \frac{3}{2}x$

$-15 \quad -15$

$9 = -\frac{3}{2}x$

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$\left(-\frac{2}{3}\right)(9) = \left(-\frac{3}{2}\right)\left(-\frac{2}{3}\right)x$

$-6 = x$ **The value of x is -6**

3. If the function $\mathbf{f(x) = 2x - 3}$ and $\mathbf{g(x) = \frac{3}{2}x + 1}$ then which of the following is a true statement?

(1) $f(0) > g(0)$ (3) $f(2) = g(2)$

(2) $f(8) = g(8)$ (4) $g(4) < f(4)$

View the table of values of each function.

x (input)	$f(x)$ (output)	$g(x)$ (output)
0	-3	1
2	1	4
4	5	7
8	13	13

$f(8) = g(8)$

4. Given the function ***f*** defined by $\mathbf{f(x) = 3x^2 - 4}$, which statement is true?

(1) $f(0) = 0$
$f(0) = 3(0)^2 - 4$
$= -4$ False

(3) $x = 5$ when $f(x) = 75$
$f(5) = 3(5)^2 - 4$
$= 75 - 4$
$= 71$ False

(2) $f(-2) = f(2)$
$f(-2) = 3(-2)^2 - 4$
$= 8$
$f(2) = 3(2)^2 - 4$
$= 8$ True

(4) $f(5) \bullet f(2) = f(10)$
$f(5) = 71$
$f(2) = 8$
$f(10) = 296$
$8 * 71 = 568$ $568 \neq 296$ False

You can also view a table of values to compare outputs given inputs. Just enter $3x^2 - 4$ into y_1.

x (input)	$f(x)$ (output)
-2	8
0	-4
2	8
5	71
10	296

5. Officials in a town use a function, P to analyze traffic patterns. ***P*(*n*)** represents the rate of traffic through an intersection where ***n*** is the number of observed vehicles in a specified time interval. What would be the most appropriate domain for the function?

(1) the set of real numbers
cannot have a negative amount of vehicles or a fraction of a vehicle

(3) the set of whole numbers {0, 1, 2, 3…}

(2) the set of rational numbers
cannot have a negative amount of vehicles or a fraction of a vehicle

(4) the set of integers (*cannot have a negative # of vehicles*)

6. Amy is purchasing t-shirts for her softball team. A local company has agreed to make the shirts for \$9 each with a one-time \$85 charge for graphic designs.

(a) Write a function rule in *function notation* that describes the cost, ***C***, for the shirts in terms of ***q***, the quantity ordered.

C: total cost of shirts
q: the number of shirts purchased

C(q) = 9q + 85

(b) Find the cost of ordering 20 t-shirts.

C(q) = 9q + 85
C(20) = 9(20) + 85
= 180 + 85
= 265

The cost of ordering 20 t-shirts is \$265

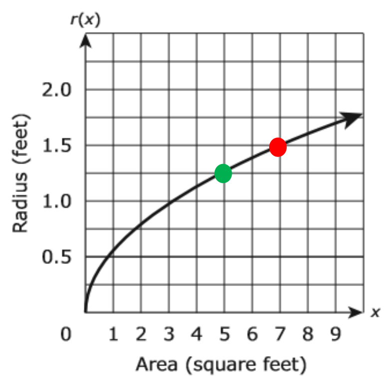
(c) If the softball team has \$450, how many t-shirts can they purchase?

C(q) = 9q + 85
450 = 9q + 85
365 = 9q
40.555… = q
The maximum number of t-shirts that can be purchased is 40.

Check:
85 + 9(40) = \$445
\$445 < \$450 It checks

85 + 9(41) = \$454
\$454 > \$450 -*too expensive*

7. The function **y = *r*(x)** represents the radius of a circle for a given area, **x**. A graph of the function is shown in this figure. Using the graph, complete a and b.



(a) Find *r*(7). Explain the meaning of this value in the context of the situation.

Input: 7 **Output: 1.5** (*see graph*)
When a circle has an area of 7 square feet, the radius of the circle is 1.5 feet.

(b) Find the value of x *to the nearest integer* if *r*(x) = 1.25.

Output: 1.25 **Input: 5** (*see graph*)
If the radius of a circle is 1.25 feet then the area is 5 square feet.

PIPS Question:

Given the function ***f*** defined by ***f*(x) =** $\mathbf{\frac{1}{2}}$ **x – 5**, the function ***h*** is defined by ***h*(x) = 4*f*(x)**.

(a) Find *h*(6)

Find *f*(6) and multiply it by 4 to get *h*(6)

f(6) = ½ (6) – 5
= 3 – 5
= -2

h(x) = 4*f*(x)
h(6) = 4*f*(6)
= 4(-2)
= -8 ***h*(6) = -8**

2nd Option:
Define *h*(x).
h(x) is 4 times *f*(x)
h(x) = 4(½x – 5) therefore *h*(x) = 2x – 20
h(6) = 2(6) – 20
***h*(6) = -8**

(b) If function *g* is defined as ***g*(x) = *h*(x) – 7**, write the function rule that describes y = *g*(x).

To define *g*(x), take *h*(x) and subtract 7. Remember, *h*(x) is 4 times *f*(x) – *see rule above*.
***g*(x) = 4(½ x – 5) – 7**
g(x) = 2x – 20 – 7
***g*(x) = 2x – 27**