Algebra Common Core Review

Numbers and Quantity – Session One

Algebra- Session Two

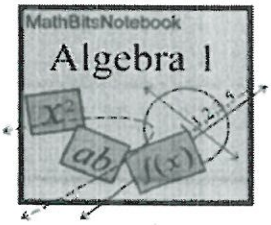
Functions- Session Three

Statistics – Session Four

Basic Functions

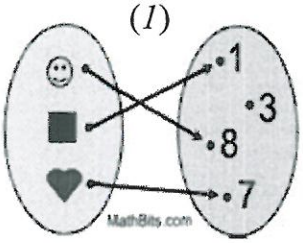
Name_____

Directions: Read carefully.

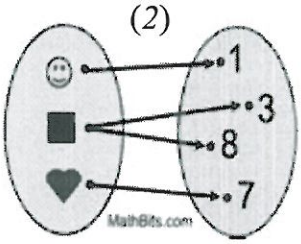


1. Which of the following diagrams shows a relation that is **not** a function?

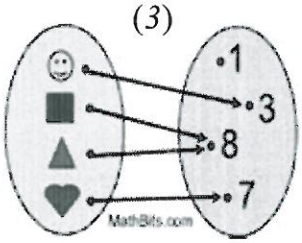
(*1*)



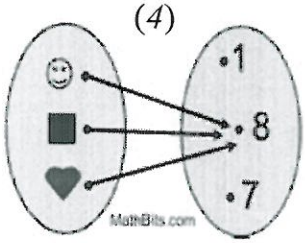
(*2*)



(*3*)



(*4*)

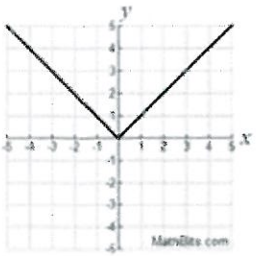


2. Given that relation $S = \{(5,-1),(-2,3),(-3,4),(k,1),(2,-2),(-6,0)\}$.
Which of the following values for k will make relation S a function?

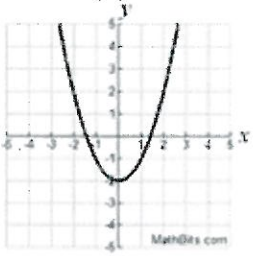
(*1*) -2 (*2*) -3 (*3*) 3 (*4*) 5

3. Which of the following graphs is **not** a function?

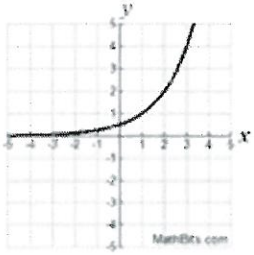
(*1*)



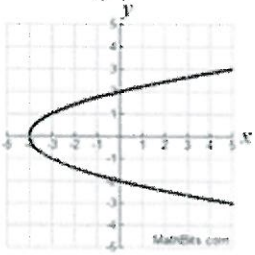
(*2*)



(*3*)



(*4*)



4. Which of the following relations is a function?

(*1*) {(3,7), (5,8), (2,1), (1,3),(5,9)}
(*2*) {(-1,2), (-2,-4), (-4,-5), (-3,-4), (-2,-2)}
(*3*) {(2,1), (1,1), (-3,3), (-4,3), (0,0)}
(*4*) {(7,1), (7,2), (7,3), (7,4), (7,5)}

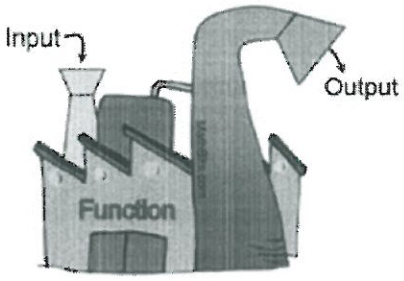
5. Is the relation shown in this chart a function? Explain.

x	-2	3	-5	-3	4	-2	-4
y	-4	7	1	0	3	4	-5

6. Given: the values $x = \{-3, -2, -1, 0, 1, 2, 3\}$ are input into a function machine, $y = x^2 - 1$. Which of the following sets will be the output from the machine?

(*1*) $\{-3, -2, -1, 0, 1, 2, 3\}$ (*2*) $\{-4, -3, -2, -1, 0, 1, 2\}$

(*3*) $\{9, 4, 1, 0\}$ (*4*) $\{8, 3, 0, -1\}$



7. Is the relation shown in this chart a function? Explain.

x	-3	-2	-1	0	1	2	3
y	-2	-2	-2	-2	-2	-2	-2

8. Which of the following relations is **not** a function?

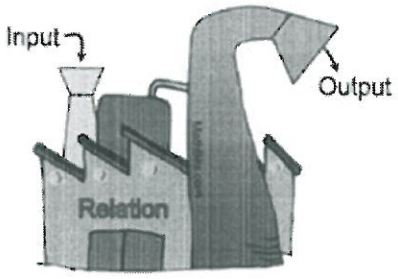
(*1*) $x + y = 5$ (*2*) $y = x^2 + 6$ (*3*) $y = |x - 2|$ (*4*) $x^2 + y^2 = 9$

9. Is the relation shown in this chart a function? Explain.

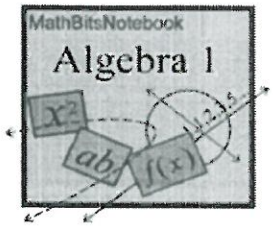
x	7	5	3	6	4	5	1
y	9	3	7	0	-3	3	7

10. Given: the values $x = \{-1, 0, 3, 8, 15\}$ are put into a relation machine, $y = \sqrt{x+1}$.

Will these x-values and their output form a function? Explain.



Function Notation and Evaluation



Name_____

Directions: Read carefully. Use your calculator only for checking.

1. Given $f(x) = 5x - 3$, find $f(-2)$.

2. Given $g(x) = 3x^2 + 2x - 4$, find $g(1.5)$.

3. Given $h(x) = 3x - 1$, find $h(a + 3)$.

4. If $f(x) = \frac{1}{x-4}$, find $f\left(\frac{1}{2}\right)$.

5. Given $f(x) = 4x - 3$ and $g(x) = x^2 + 2x + 1$.

a) Find $f(-1)$.

b) Find $g(3)$.

c) Find $f(2) + g(-2)$.

d) Find $f\left(\frac{1}{2}\right)$.

e) Find $[g(-1)]^2$.

6. Given f: {whole numbers} → {whole numbers}. The function f accepts a whole number and returns the square of the smallest place value digit in the number. [*Hint:* smallest place value digit in 34 is 3.]

a) Find the domain of f.

b) Find the range of f.

c) Find $f(24)$.

d) Find $f(854)$.

e) Find $f(0)$.

f) For which value of x is $f(x) = 49$?
1) 497 2) 267 3) 87 4) 73

7. Given the function: $f(x) = 4x + 1$.

a) Find $f(a)$.

b) Find $f(3c)$.

c) Find $f(-x)$.

d) Find $f(a + 3)$.

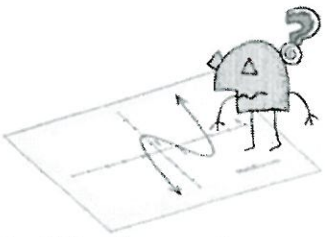
e) Find $f(a + h)$.

8. Let $g(x) = 2x^2 - 3x + 5$. Find $g(3b)$.

9. Let $h(x) = (0.5)2^x$. Find $h(3a)$.

10. Let $f(x) = 3x^2 + 1$. Does $f(x + h) = f(x) + f(h)$?
Explain your answer.

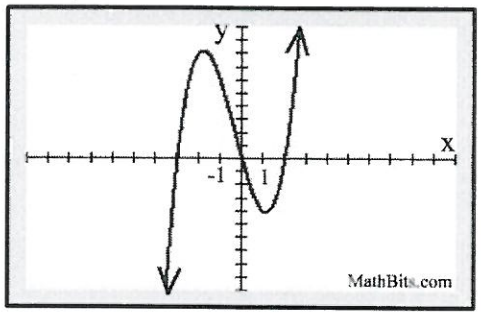
What's My Function?



Name _____

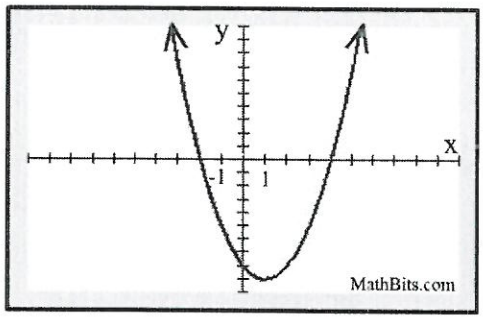
Directions: You are told that the following graphs represent polynomial functions of degree two or three. Examine the graphs and write a quadratic (degree 2) or cubic (degree 3) function that will produce each given graph. You may assume that the graphs cross (or touch) the x-axis at integer locations. Use your graphing calculator for checking only.

1.



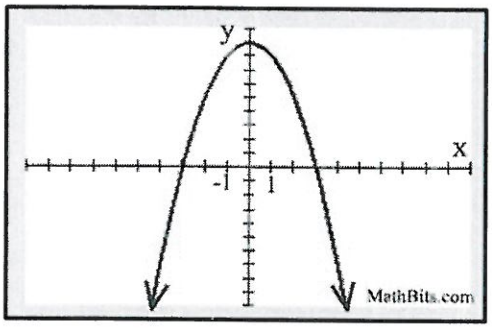
Function: _____

2.



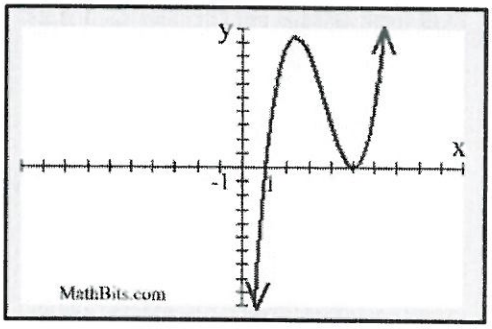
Function: _____

3.



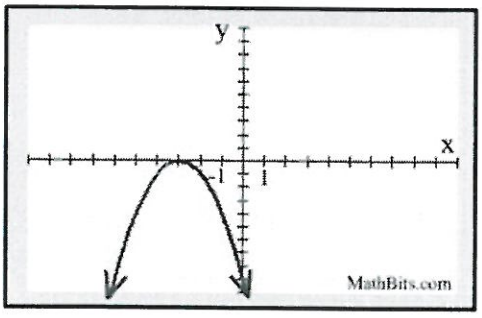
Function: _____

4.



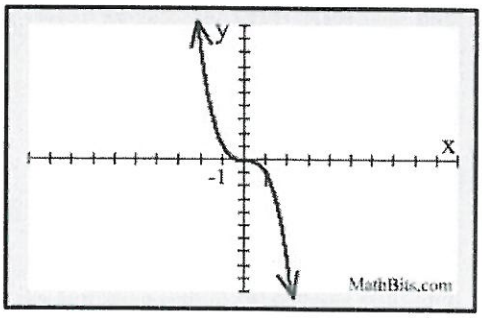
Function: _____

5.



Function: _____

6.



Function: _____

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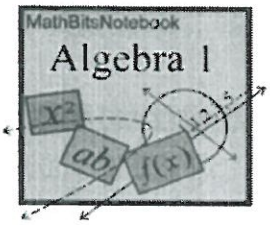
Sequences

Name_____

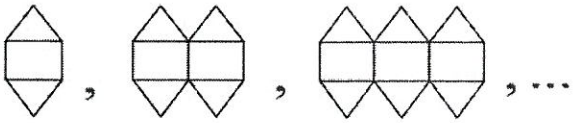
Directions: Read carefully.



1. Which of the following function formulas describes this sequence? {4, 8, 16, 32, 64, ...}

1) $f(n) = n + 4$ *2)* $f(n) = 4n$ *3)* $f(n) = 2^n$ *4)* $f(n) = 2^{n+1}$

2. The following diagrams form a sequence based upon the number of toothpicks needed to create the shapes.



a) Write a numerical sequence, in list form, to represent this sequence.

b) How many toothpicks are needed to create the 6^{th} diagram in this sequence?

3. List the first 5 terms of the sequence generated by $a_n = 4n - 3$.

4. The sequence shown below is an arithmetic sequence. What is the value of the missing term?

{6, 9, ☐, 15, 18, ...}

5. List the first five terms of the sequence generated by $f(n) = \frac{n}{3}$.

6. Which of the following sequences is a geometric sequence?

1) {2, 4, 6, 8, 10, ...} *2)* {2, 4, 7, 11, 16, ...} *3)* {2, 4, 8, 16, 32, ...} *4)* {2, 8, 14, 20, 26, ...}

7. What is the common difference in this arithmetic sequence? $\{16, 10, 4, -2, -8, \ldots\}$

8. What are the first three terms of this sequence? $a_n = n^2 + 1$

9. What is the tenth term of this sequence? $a_n = (-1)^{n-1} \cdot n^2$

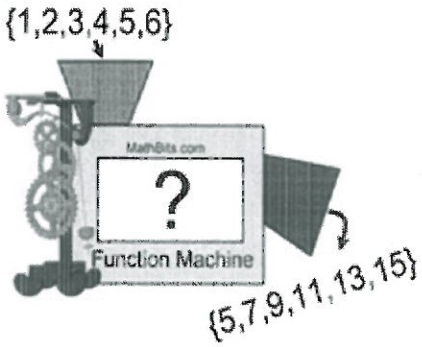
10. Find the fourth term of this geometric sequence. $\{459, 153, 51, \ldots\}$

11. What are the first four terms of this sequence? $f(1) = -2$; $f(n) = f(n - 1) + 4$

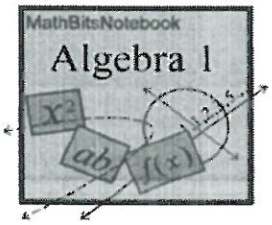
12. Which function "rule" is at work in the function machine shown at the right?

1) $f(n) = n + 4$ *2)* $f(n) = 2n + 3$

3) $f(n) = 3n + 2$ *4)* $f(n) = 4n - 1$



Writing Sequence Formulas



Name_____

Directions: These questions will ask you to write formulas for sequences. There may be more than one notation or one form for your answers.

1. Given the sequence: {6, 16, 26, 36, …}

a) Write an explicit formula for this sequence.

b) Write a recursive formula for this sequence.

2. Given the following sequence:

n	1	2	3	4	…
$f(n)$	2	4	8	16	…

a) Write an explicit formula for this sequence.

b) Write a recursive formula for this sequence.

3. An explicit formula for a sequence is $f(n) = (-1)^n \cdot 2$.

a) List the first 5 terms of this sequence.

b) Write a recursive formula for this sequence.

4. Given the sequence: {1, 4, 9, 16, …}

a) Write an explicit formula for this sequence.

b) Write a recursive formula for this sequence.

5. Given the sequence: {1, 5, 25, 125, …}

a) Write an explicit formula for this sequence.

b) Write a recursive formula for this sequence.

6. Given the sequence: {10, 2, -6, -14, …}

a) Write an explicit formula for this sequence.

b) Write a recursive formula for this sequence.

7. Given the sequence: $\left\{1, \frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \ldots\right\}$

a) Write an explicit formula for this sequence.

b) Write a recursive formula for this sequence.

8. Given the sequence: $a_1 = 6$ and $a_{n+1} = a_n + 4$.

a) List the first 5 terms of this sequence.

b) Write an explicit formula for this sequence.

9. Given the sequence: $a_1 = -20$ and $a_n = a_{n-1} \div 2$.

a) List the first 5 terms of this sequence.

b) Write an explicit formula for this sequence.

10. Given: $f(1) = 3$ and $f(n) = f(n\text{-}1) + 2$.

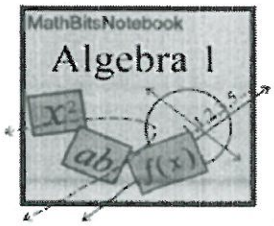
a) List the first 5 terms of this sequence.

b) Write an explicit formula for this sequence.

Inverse Practice

Name_____

Directions: Read carefully.



1. Given $f(x) = \{(2,3), (1,-8), (5,3), (9,0)\}$.

a) Which list represents the inverse of $f(x)$?

1) $f^{-1}(x) = \{(1,-8), (2,3), (5,3), (9,0)\}$ *2)* $f^{-1}(x) = \{(3,2), (-8,1), (3,5), (0,9)\}$

3) $f^{-1}(x) = \{(3,2), (1,-8), (3,5), (9,0)\}$ *4)* $f^{-1}(x) = \{(2,6), (1,-8), (5,15), (9,0)\}$

b) Is the inverse a function? *1)* Yes *2)* No

Explain.

2. Given the following function:

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

a) What is the inverse of $f(x)$?

1) $f^{-1}(x) = \{(1,6),(-3,3),(4,-2),(0,4),(-2,-1),(5,5),(2,7),(-1,0)\}$

2) $f^{-1}(x) = \{(6,1),(-3,3),(-2,4),(4,0),(-2,-1),(5,5),(7,2),(-1,0)\}$

3) $f^{-1}(x) = \{(6,1),(3,-3),(-2,4),(4,0),(-1,-2),(5,5),(7,2),(0,-1)\}$

4) $f^{-1}(x) = \{(1,5),(-3,6),(4,-6),(0,4),(-2,1),(5,0),(2,5),(-1,1)\}$

b) Is the inverse a function? *1)* Yes *2)* No

Explain. .

3. What is the inverse of $f(x) = 3x + 1$?

1) $f^{-1}(x) = \frac{3x-1}{3}$ *2)* $f^{-1}(x) = \frac{3x+1}{3}$ *3)* $f^{-1}(x) = \frac{x+1}{3}$ *4)* $f^{-1}(x) = \frac{x-1}{3}$

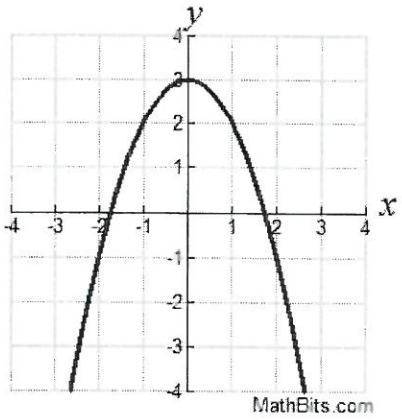
4. Which function will not pass the Horizontal Line Test, which tells us that its inverse is not a function?

1) $g(x) = 4x + 5$ *2)* $h(x) = x^2 + 3$ *3)* $f(x) = 2^x$ *4)* $s(x) = (x + 3) / 2$

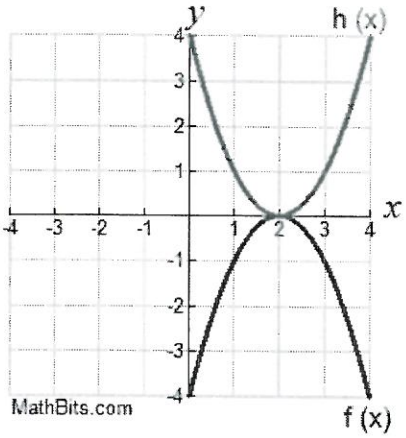
5. The inverse of the graph shown at the right will also be a function.

1) True *2)* False

Explain.



6. As seen in the graph at the right, function $f(x)$ is a reflection of function $h(x)$.
Is function $f(x)$ the inverse of function $g(x)$?
1) Yes *2)* No
Explain.



7. a) Find the inverse of $f(x) = x^2 + 4$.

1) $f^{-1}(x) = \pm\sqrt{x+4}$ *2)* $f^{-1}(x) = \pm\sqrt{x-4}$ *3)* $f^{-1}(x) = x^2 - 4$ *4)* $f^{-1}(x) = 4 - x^2$

b) Is the inverse a function? *1)* Yes *2)* No
Explain.

8. The function $g(x) = (x + 2)^2$ for $x \geq -2$ will have an inverse function.
1) True *2)* False
Explain.