

### HSD SUMMATIVE ASSESSMENT

COURSE: Algebra 1 (8<sup>th</sup>)  
 UNIT 3: Quadratic Functions and Modeling

ANSWER KEY  
 PG 1 OF 5

Student Name: \_\_\_\_\_

Class Period: \_\_\_\_\_

Date: \_\_\_\_\_

**Question 1** Standard: A1.LQE.A.2 Blooms: Apply DOK: 2 Total Points: 5

Find the vertex, the equation of the axis of symmetry, and the y-intercept for the function below:

$y = 2x^2 + 4x - 3$

Show ALL work here (2 points):

$$\frac{-b}{2a} = \frac{-(4)}{2(2)} = \frac{-4}{4} = \underline{\underline{-1}}$$

$$f(-1) = 2(-1)^2 + 4(-1) - 3$$

$$= 2 - 4 - 3$$

$$f(-1) = -5$$

STUDENTS SHOULD BE FAMILIARIZED W/ THIS NOTION  
 "C" IS ALWAYS THE y-int. IN A QUADRATIC

Answers (1 point each):

Vertex:  $(-1, -5)$

Axis of Symmetry:  $x = -1$

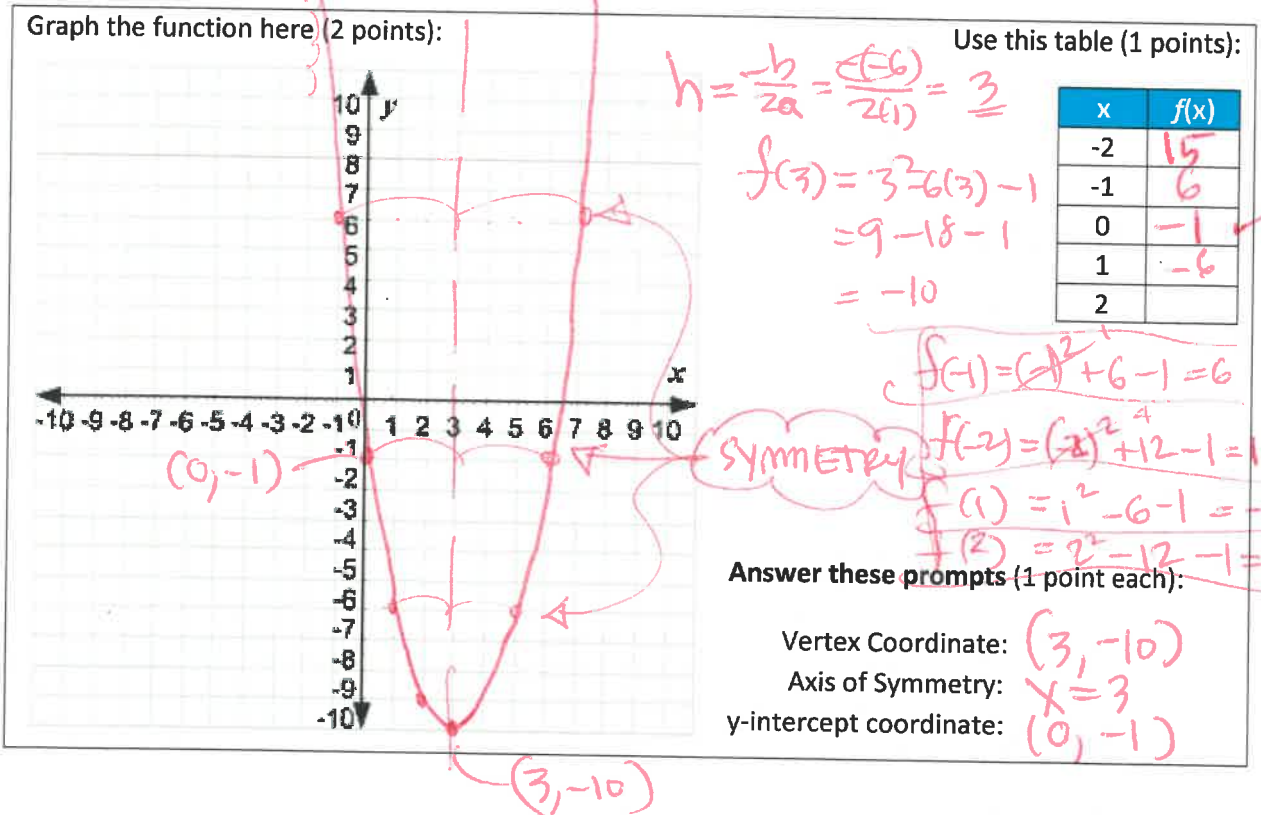
y-intercept:  $(0, -3)$

**Question 2** Standard: A1.IF.B.3 Blooms: Analyze DOK: 1 Total Points: 6

Complete the table to graph and label the given function in the space provided below:

$y = x^2 - 6x - 1$

Graph the function here (2 points):



Use this table (1 point):

x	f(x)
-2	15
-1	6
0	-1
1	-6
2	

$$h = \frac{-b}{2a} = \frac{-(-6)}{2(1)} = 3$$

$$f(3) = 3^2 - 6(3) - 1$$

$$= 9 - 18 - 1$$

$$= -10$$

$$f(-1) = (-1)^2 + 6 - 1 = 6$$

$$f(-2) = (-2)^2 + 12 - 1 = 15$$

$$f(1) = 1^2 - 6 - 1 = -6$$

$$f(2) = 2^2 - 12 - 1 = -9$$

Answer these prompts (1 point each):

Vertex Coordinate:  $(3, -10)$

Axis of Symmetry:  $x = 3$

y-intercept coordinate:  $(0, -1)$

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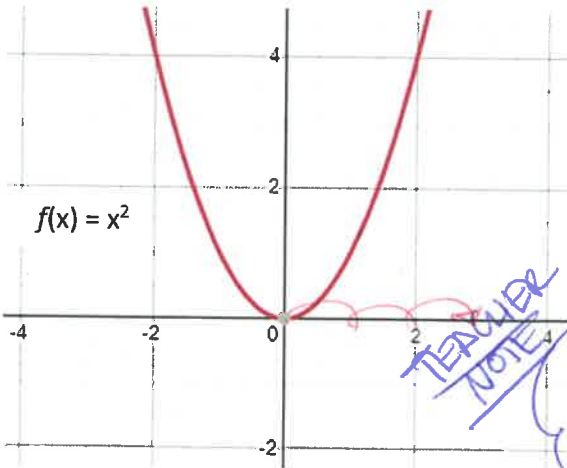
Student Name:

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Question 3 Standard: A1.BF.A.1 Blooms: Analyze DOK: 2 Total Points: 2

Describe in words how the function  $f(x) = x^2$  (shown below) changes to become the function  $g(x) = (x-3)^2$ :



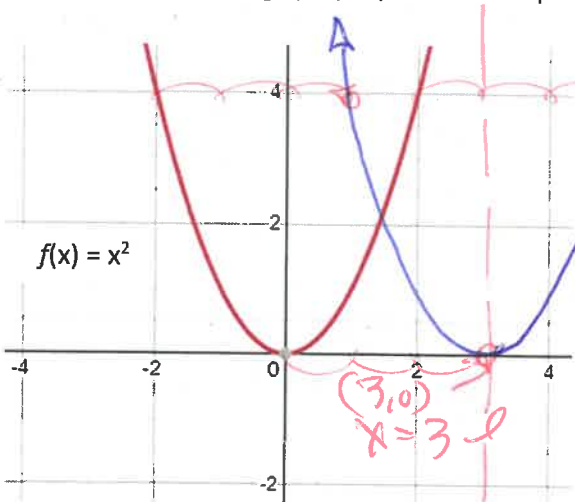
Give your explanation here (2 points):

THE  $g(x)$  FUNCTION IS EQUIVALENT TO THE  $f(x)$  FUNCTION EXCEPT FOR IT HAS BEEN MOVED TO THE RIGHT 3 UNITS.

TEACHER NOTE: THERE ARE NUMEROUS WAYS TO ANSWER THIS ∴ TEACHER SHOULD READ CAREFULLY FOR STUDENT UNDERSTANDINGS.

Question 4 Standard: A1.IF.C.8 Blooms: Analyze DOK: 2 Total Points: 5

Sketch the function  $g(x) = (x-3)^2$  on the axis provided below:



Work area:

SHIFT FUNCTION AS DIRECTED BY THE "h" VALUE IN THE PARENTHESIS. NO SHIFT IN "k" AS IT = ZERO

Answer the prompts below (1 point each):

Vertex Coordinate: (3,0)

Axis of Symmetry: x=3

y-intercept coordinate: (0,9)

Sketch your graph above (2 points)

$$g(x) = (x-3)^2 + 0 \rightarrow x^2 - 6x + 9$$

Polynomial Form

Total Points for this Page:

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**Question 5**      Standard: A1.LQE.A.1    Blooms: Analyze    DOK: 2    Total Points: 6

Analyze the tables below and assess what type of function they represent:

Circle your choices and show all of your work in the spaces provided below:

x	f(x)
-1	8
0	4
1	2
2	1
3	0.5

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

x	f(x)
-2	8
-1	2
0	0
1	2
2	8

Circle one (1 point):  
 Exponential  
 Quadratic  
 Linear

Circle one (1 point):  
 Exponential  
 Quadratic  
 Linear

Circle one (1 point):  
 Exponential  
 Quadratic  
 Linear

Work/Rationale (1 points):

THIS SEEMS TO BE GROWING AT AN EVER INCREASING RATE ... TEST OUTPUT RATIOS:  
 $\frac{8}{4} = \frac{4}{2} = \frac{2}{1} = \frac{0.5}{1} = 0.5$   
 $\therefore$  EXPONENTIAL

Work/Rationale (1 points):

SINCE WE HAVE A COMMON DIFFERENCE FOR ALL INPUTS & OUTPUTS (RELATIVE TO ONE ANOTHER) THIS IS A "SLOPE" OF  $\frac{5}{1} \therefore$  LINEAR

Work/Rationale (1 points):

SINCE WE HAVE SYMMETRY AROUND THE POINT (0, 0) THIS IS A QUADRATIC FUNCTION

**Question 6**      Standard: A1.LQE.A.3    Blooms: Analyze    DOK: 2    Total Points: 1

Analyze the table below and identify a function which best represents the data:

x	f(x)
-1	1
0	0
1	1
2	4
3	9

- a) Linear                      c) Exponential  
 b) Quadratic                d) Cubic

TEACHER NOTE

STUDENTS SHOULD BE FAMILIAR W/ THIS TEST

SINCE WE ARE MOVING IN CONSECUTIVE ODD INTEGERS FOR OUR OUTPUTS ... QUADRATIC

Total Points for this Page: \_\_\_\_\_

TEACHER NOTE  
THIS IS A TEST STUDENTS SHOULD BE FAMILIAR WITH

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**Question 7**      Standard: 8.EE1.B      Blooms: Analyze      DOK: 2      Total Points: 2

Simplify the following exponential expression using the rules for exponents as your guide:

$$(5x^2y)^2 (2xy^2z)^3 (4xyz^2)$$

Show ALL work necessary (1 points):

$$\begin{aligned} & (5^2 x^4 y^2) (2^3 x^3 y^6 z^3) (4xyz^2) \\ & \downarrow \qquad \qquad \qquad \downarrow \qquad \qquad \qquad \downarrow \\ & 800 x^4 x^3 x y^2 y^6 y z^3 z^2 \end{aligned}$$

Answer (1 point):

$$800x^8y^9z^5$$

**Question 8**      Standard: 8.EE1.B      Blooms: Analyze      DOK: 2      Total Points: 3

Simplify the following exponential expression using the rules for exponents as your guide:

$$\left( \frac{b^4c^5}{a^4b^4c^3} \right)^2$$

Show ALL work necessary (2 points):

$$\left( \frac{a^4 b^4 b^4 c^5}{c^3} \right)^2 = (a^4 b^8 c^2)^2 = a^8 b^{16} c^4$$

Answer (1 point):

$$a^8 b^{16} c^4$$

**Question 9**      Standard: A1.NQ.A.1      Blooms: Analyze      DOK: 2      Total Points: 2

Simplify the following exponential expression using the rules for exponents as your guide:

$$(16x^2y^4)^{1/2} (8x^3y^9z^{12})^{1/3}$$

Show ALL work necessary (1 points):

$$\begin{aligned} & (\sqrt{16x^2y^4}) (\sqrt[3]{8x^3y^9z^{12}}) \\ & \downarrow \qquad \qquad \qquad \downarrow \\ & (4xy^2) (2xy^3z^4) \end{aligned} \rightarrow 8x^2y^5z^4$$

Answer (1 point):

$$8x^2y^5z^4$$

Total Points for this Page: \_\_\_\_\_

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**Question 10**

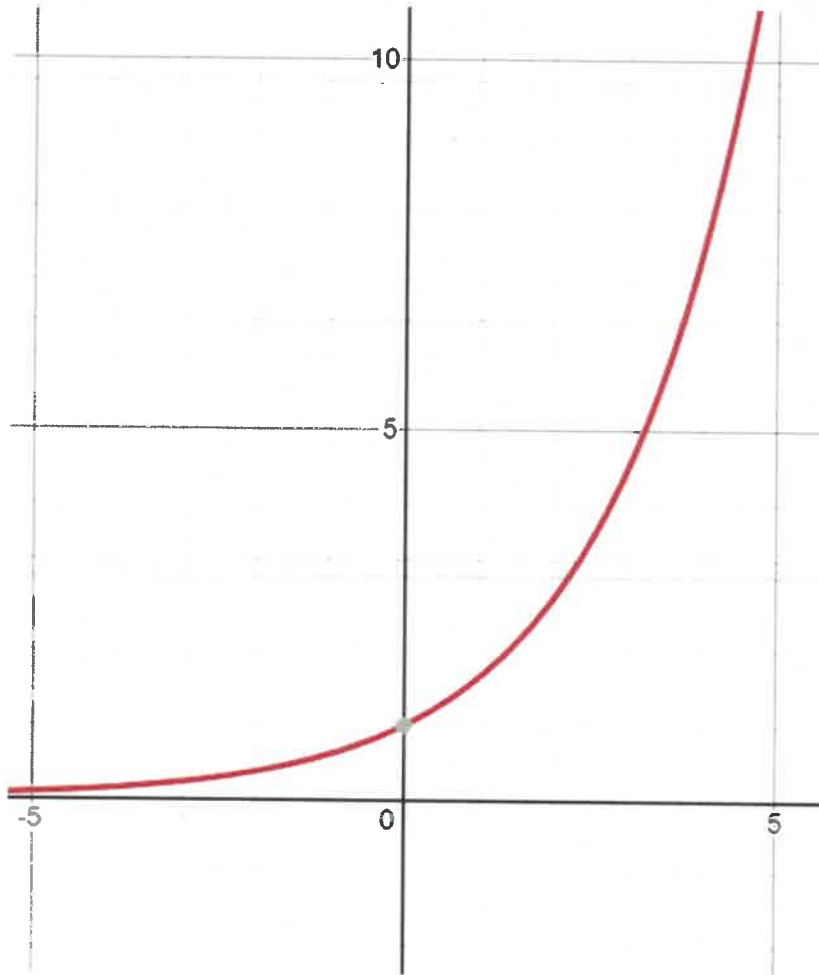
Standard: A1.IF.C.7

Blooms: Analyze

DOK: 2

Total Points: 2

Given the following graphic, analyze and determine the function which best describes the shape:



Circle one choice only (1 point):

a) Linear

b) Quadratic

c) Exponential

d) Cubic

What is the y-intercept coordinates? (1 point)

Answer: (0, 1)

Total Points for this Page: