Enhanced End of Topic Assessment

Name _____ Date _____

Part A: Multiple-Choice Questions

1. What is the solution set of the quadratic inequality $2x^2 - 2x + 12 \geq 36$?

a. $x \in (-\infty, -4]$ or $x \in [3, \infty)$

b. $x \in (-\infty, -3]$ or $x \in [4, \infty)$

c. $x \in [-4, 3]$

d. $x \in [-3, 4]$

2. What are the solutions to this system of equations?

$$\begin{cases} y = x + 2 \\ y = x^2 + 2 \end{cases}$$

a. (0, −2) and (1, 3)

b. (0, 2) and (1, 3)

c. (0, −2) and (−1, −3)

d. (0, 2) and (−1, −3)

3. Which statement about the relationship between a function and its inverse is **NOT** true?

a. The domain of a function is the range of the inverse of the function.

b. The range of a function is the domain of the inverse of the function.

c. The graph of the inverse of a function is the reflection across the line $y = x$ of the graph of the function.

d. The inverse of a function is always a function.

4. The table shows the number of visitors to the Daisy Festival on certain days since May 1.

Days Since May 1	Number of Visitors
0	215
3	520
6	725
9	865
12	955
15	1025
18	970
21	874
24	710
27	490
30	207

Which regression equation best models the data?

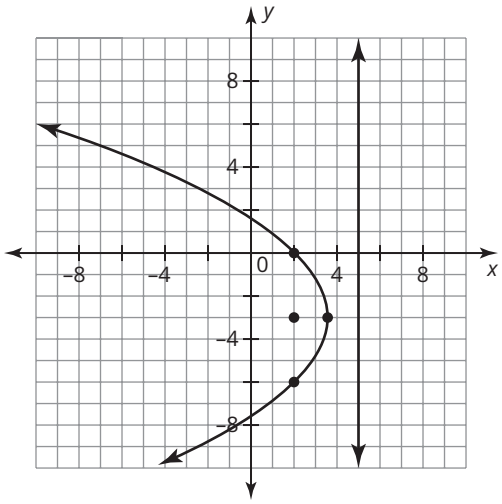
a. $f(x) = -0.5212x + 694.73$

b. $f(x) = -3.5035x^2 + 104.58x + 221.76$

c. $f(x) = 620.58\ (0.999)^x$

d. The regression cannot be determined.

5. What is the equation of a parabola with a focus at (2, –3) and a directrix of $x = 5$, as shown?



a. $y^2 = -6x - 4y + 12$

b. $y^2 = 4x - 6y + 12$

c. $y^2 = -4x - 4y + 12$

d. $y^2 = -6x - 6y + 12$

Part B: Open-Response Questions

6. A soccer ball is kicked upward from a height of 2 feet with an initial vertical velocity of 30 feet per second. When is the soccer ball above 10 feet? Round to the nearest hundredth. Recall that vertical motion can be represented by the equation $h(t) = -16t^2 + v_0t + h_0$.

7. Kara and Sam are playing a guessing game. Kara tells Sam that she is thinking of two positive integers. The first number minus the second number is 6. The square of the first number minus 2 times the second number is equal to 92.

a. Write a system of equations for the situation.

b. Solve the system of equations for the situation.

c. Explain if the solution(s) to the system make sense in the problem situation.

8. The table shows the daily sales at a boutique since the first of the month.

Days Since Opening	Amount of Sales (dollars)
0	800
1	760
2	700
3	670
4	640
5	620
10	560
12	550
15	610
20	810

a. Determine the regression equation that best models the data.

b. Based on this model, what would the daily amount of sales be on the 30th day?

9. Consider the function shown.

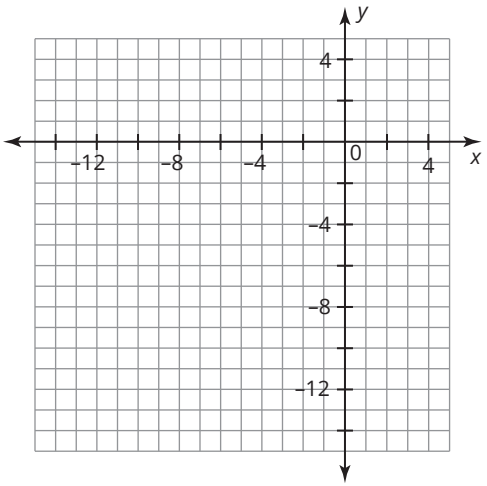
$f(x) = 3x^2 - 15$

a. Determine the inverse of $f(x)$.

b. Is the inverse of $f(x)$ a function? If yes, explain your reasoning. If no, explain how can you restrict the domain of $f(x)$ so that $f^{-1}(x)$ is a function.

10. Analyze the function $f(x) = -2x^2 - 4$.

a. Sketch a graph of the function and its inverse. Use a solid line for the function and a dashed line for its inverse.



b. Is the inverse of $f(x)$ a function? If yes, explain your reasoning. If no, explain how can you restrict the domain of $f(x)$ so that $f^{-1}(x)$ is a function.

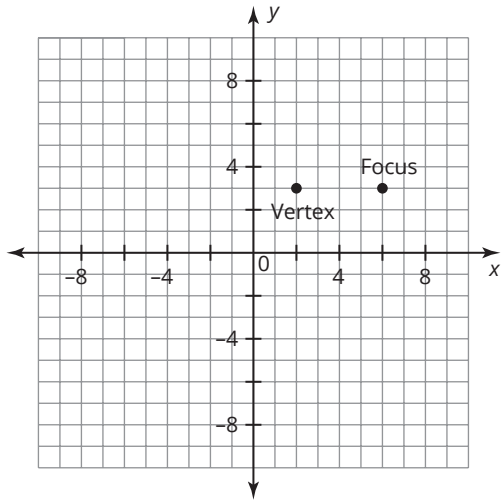
11. A penny drops from a building 45 feet above the ground. The function $h(t) = -16t^2 + 45$ gives the height of the penny in feet after t seconds.

a. Based on the problem situation, what are the domain and range of $h(t)$? the domain and range of the inverse of $h(t)$?

b. Based on the problem situation, write a function for $h^{-1}(t)$. What does this function represent in terms of the problem situation?

12. Write an equation for a parabola with a vertex at (0, 0) and a focus at (0, –4).

13. Use the graph of two reference points for a parabola with a vertex at (2, 3) and a focus at (6, 3) to determine its equation. Explain your steps. Then, graph the parabola.



14. Without graphing or using the Distance Formula, determine the equation of a parabola with a focus at (3, 8) and a directrix at $y = 2$. Explain your method for determining the equation.

Part C: Griddable Response Questions

Record your answers and fill in the bubbles.

15. What is the *x*-value of the solution to the system of equations shown?

$$\begin{cases} y = 2x^2 + 16x + 24 \\ y = -8 \end{cases}$$