Algebra 2 District Common Assessment 1

Name:_____

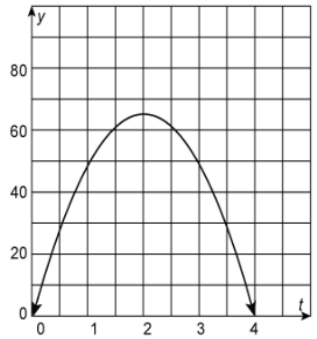
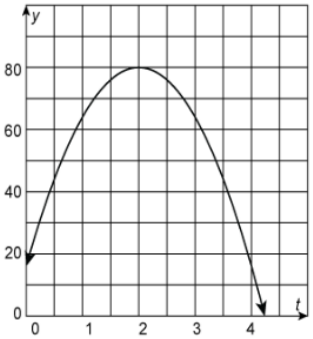
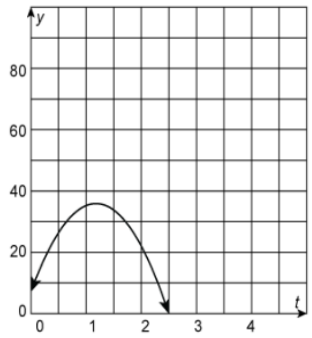
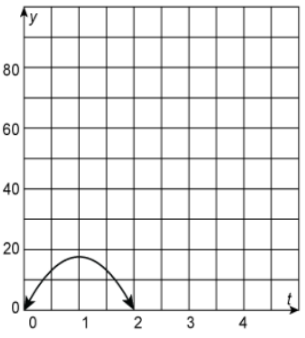
Block: _____

Test Part 1

1. What is the equation written in vertex form of a parabola with a vertex $(-1,8)$ that passes through $(1,0)$?
   - A. $y = (x+1)^2 + 8$
   - B. $y = 2(x-1)^2 - 8$
   - C. $y = 2(x+1)^2 - 8$
   - D. $y = -2(x+1)^2 + 8$

2. Function g is a transformation of a parent function $f(x) = x^2$. The graph of g is a translation left 4 units and down 2 units of the graph of f.
   Write the equation for g in the form $y = ax^2 + bx + c$.
   - A. $y = x^2 + 8x + 18$
   - B. $y = x^2 + 8x + 14$
   - C. $y = x^2 - 8x + 18$
   - D. $y = x^2 - 8x + 14$

3. What is the vertex of the graph of the function $f(x) = x^2 + 6x + 9$?
   - A. $(-3, 0)$
   - B. $(0, -3)$
   - C. $(0, 3)$
   - D. $(3, 0)$

4. **<u>Part A:</u>** The path of a projectile launched from a 16-ft-tall tower is modeled by the equation $y = -16t^2 + 64t + 16$. Which is the correct graph of the equation?
   - A. 
   - B. 
   - C. 
   - D. 

Part B: The path of a projectile launched from a 16-ft-tall tower is modeled by the equation $y = -16t^2 + 64t + 16$. What is the maximum height, in feet, reached by the projectile?

The maximum height is _____ feet.

5. Use quadratic regression to find the equation of a quadratic function that fits the given points.

x	0	1	2	3
y	6.1	71.2	125.9	89.4

   - A. $y = 8.52x^2 - 16.72x + 23.47$
   - B. $y = -18.25x^2 + 94.32x + 4.08$
   - C. $y = 2.5x^2 - 10.5x + 2$
   - D. $y = -25.4x^2 + 106.66x + 2.06$

6. Solve the equation $x^2 + x = 12$
   - A. $x = -3$ and $x = -4$
   - B. $x = 2$ and $x = -6$
   - C. $x = -2$ and $x = -6$
   - D. $x = 3$ and $x = -4$

7. A ball is thrown from the top row of seats in a stadium. The function $g(t) = -16t^2 + 64t + 80$ gives the height, h, in feet, of the ball t seconds after it is thrown. How long will it be before the ball hits the ground?

   The ball will hit the ground after _____ seconds.

8. Identify the interval(s) on which the function $y = x^2 - 2x - 48$ is positive.
   - A. $x < -6$ and $x > 8$
   - B. $-6 < x < 8$
   - C. $x > 6$ and $x < -8$
   - D. $6 < x < 8$

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Test Part 2

9. Use square roots to solve the equation $x^2 = -25$ over the complex numbers. Select any solutions that apply.

   ☐ A. -5
   ☐ B. $-5i$
   ☐ C. $-5i^2$
   ☐ D. $5i$

10. Write the product $(4 + i)(4 - i)$ in the form $a + bi$.

   ○ A. $16 - i$
   ○ B. $16 - i^2$
   ○ C. 17
   ○ D. 8

11. Write the quotient $\frac{10}{1+2i}$ in the form $a + bi$.

   ○ A. $-\frac{10}{3} + \frac{20}{3}i$
   ○ B. $10 - 5i$
   ○ C. $\frac{5}{2} + \frac{1}{2}i$
   ○ D. $2 - 4i$

12. Factor the expression $16x^2 + 25$.

   ○ A. $(4x - 5i)(4x - 5i)$
   ○ B. $(4x - 5i)(4x + 5i)$
   ○ C. $(4x - 5)(4x + 5i)$
   ○ D. $(4x + 5)(4x - 5)$

13. Solve $0 = x^2 - 10x + 30$ by completing the square.

   ○ A. $x = 5 + i$ and $x = 5 - i$
   ○ B. $x = 5 + i\sqrt{5}$ and $x = 5 - i\sqrt{5}$
   ○ C. $x = -5 - i\sqrt{6}$ and $x = -5 + i\sqrt{6}$
   ○ D. $x = -5 - i\sqrt{5}$ and $x = -5 + i\sqrt{5}$

14. A function defined by the equation $y = x^2 + 3x + 1$. Which statements are true? Select all that apply.

- ☐ A. The equation written in vertex form is $y = \left(x + \frac{3}{2}\right)^2 - \frac{5}{4}$.
- ☐ B. The equation written in vertex form is $y = \left(x + \frac{5}{4}\right)^2 - \frac{3}{2}$.
- ☐ C. The graph of the function has a minimum of $y = -\frac{5}{4}$ at $x = -\frac{3}{2}$.
- ☐ D. The domain of the function is all real numbers.

15. Solve $x^2 + 3x + 4 = 0$ using the Quadratic Formula. Select any solutions that apply.

- ☐ A. $x = \frac{-3 + i\sqrt{7}}{2}$
- ☐ B. $x = \frac{-3 - i\sqrt{7}}{2}$
- ☐ C. $x = \frac{-3 + \sqrt{7}}{2}$
- ☐ D. $x = \frac{-3 - \sqrt{7}}{2}$

16. Solve $x^2 - 7x + 5 = 0$ using the Quadratic Formula.

- ○ A. $x = \frac{7+\sqrt{29}}{2}$ and $x = \frac{7-\sqrt{29}}{2}$
- ○ B. $x = 7 + \sqrt{29}$ and $x = 7 - \sqrt{29}$
- ○ C. $x = -5$ and $x = -1$
- ○ D. $x = \frac{7+\sqrt{69}}{2}$ and $x = \frac{7-\sqrt{69}}{2}$

17. **Part A:** A toy cannon ball is launched from a cannon on top of a platform. The equation $h(t) = -5t^2 + 20t + 4$ gives the height *h*, in meters, of the ball *t* seconds after it is launched. What equation can be used to tell whether the ball reaches a height of 12 m?

- ○ A. $-5t^2 + 20t + 4 = 0$
- ○ B. $-5t^2 + 20t + 4 = 12$
- ○ C. $-5t^2 + 20t + 4 + 12 = 0$
- ○ D. $-5t^2 + 20t + 4 = t + 12$

Part B: A toy cannon ball is launched from a cannon on top of a platform. The equation $h(t) = -5t^2 + 20t + 4$ gives the height h, in meters, of the ball t seconds after it is launched. Does the ball reach a height of 12 m?

- A. yes
- B. no

18. What value(s) of b will cause $4x^2 + bx + 25 = 0$ to have one real solution? Select all that apply.

- ☐ A. $b = -20$
- ☐ B. $b = -50$
- ☐ C. $b = 20$
- ☐ D. $b = 100$

19. Determine the number of real solutions of the system $\begin{cases} y = x^2 + 8 \\ y = x + 15 \end{cases}$.

- A. 0
- B. 1
- C. 2
- D. 3

20. Solve the equation $-3x^2 + 2x + 4 = -x - 3$ by writing a linear-quadratic system and solving using the intersection feature of a graphing calculator. Round to the nearest hundredth.

- A. $x \approx -2.44$ and $x \approx 3.12$
- B. $x \approx -1.63$ and $x \approx 4.43$
- C. $x \approx -1.11$ and $x \approx 2.11$
- D. $x \approx -2.61$ and $x \approx 0.42$