Name_____ Period_____ Date_____

NON-CALCULATOR SECTION

Vocabulary: Define each word and give an example.

1. Solution of a Quadratic Equation

2. Zero Product Property

Short Answer:

3. Explain graphically why the equation $ax^2 + bx + c = 0$ can have one, none, or two real solutions.

4. Why do we need the imaginary number system? What is the imaginary unit?

Review:

5. Factor the polynomial: $169 - 9y^2$

6. Write the recursive and explicit formula for the geometric sequence: 2, 8, 32, 128, …

7. Solve the system of linear equations: $\begin{aligned} x + y &= 5 \\ 2x - 3y &= 4 \end{aligned}$

Problems:
Be sure to **show all work used to obtain your answer. Circle or box in the final answer.**

Simplify:
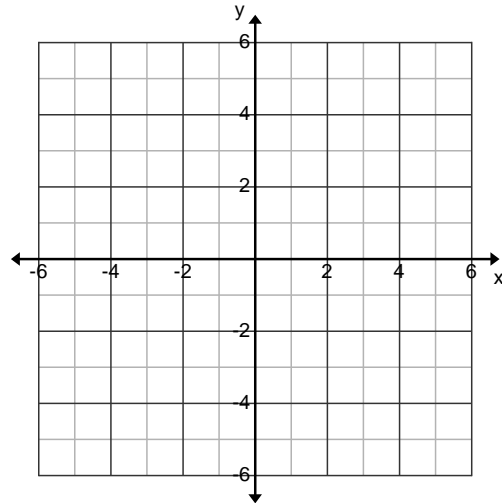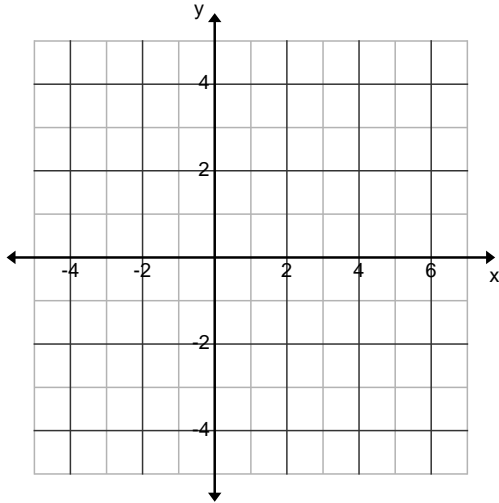
8. $\sqrt{-25}$ 9. $\sqrt{-48}$ 10. $-\sqrt{-8}$

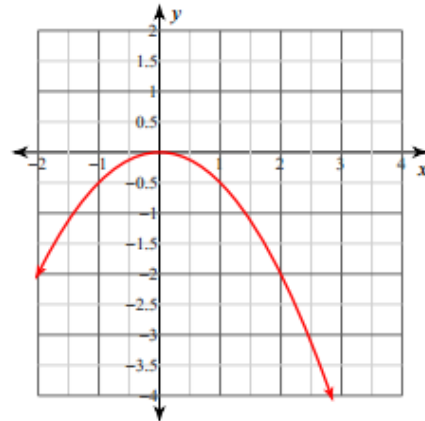11. Solve the quadratic equations by **graphing.**

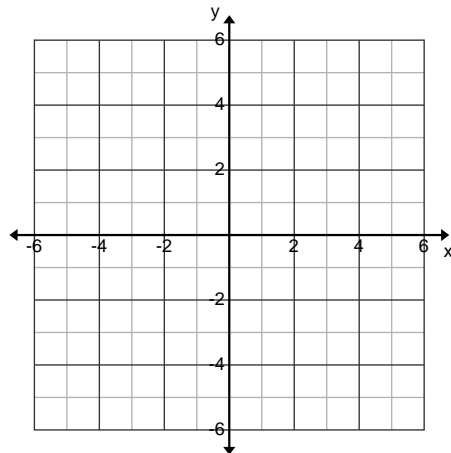　　a. $y = x^2 - 8x + 15$ 　　　　　　　　　b. $y = x^2 - 2x - 3$

12. Given the graphs, identify how many roots there are and what they are.

　　a._____　　　　b._____

13. Sketch the graph of a quadratic function that has no solutions:

14. Solve the quadratic equations by **factoring**.

   a. $3k^2 + 72 = 33k$

   b. $9x^2 - 12x + 4 = 0$

   c. $2n^2 + 9n + 10 = 0$

   d. $2m^2 + 18m = 0$

   e. $49x^2 - 121 = 0$

   f. $3x^2 - 8x = 16$

15. Solve the quadratic equations by **square roots**.

   a. $5x^2 = 100$

   b. $3(x+1)^2 + 4 = 22$

   c. $-2x^2 = -6$

   d. $9n^2 + 10 = 91$

   e. $5y^2 + 4 = -11$

   f. $4(6x-1)^2 - 5 = 23$

16. Joe's rectangular garden is 6 meters long and 4 meters wide. He wishes to double the area of his garden by increasing its length and width by the same amount. Find the number of meters by which each dimension must be increased.

17. Find three consecutive positive even integers such that the product of the second and third integers is twenty more than ten times the first integer.

Multiple Choice Section: **Circle the best answer.**

18. Which of the following equations has roots of -3 and 1?

    A. $(x-3)(x+1)=0$
    B. $(x-3)(x-1)=0$
    C. $(x+3)(x+1)=0$
    D. $(x+3)(x-1)=0$

19. The area of a right triangle is represented by $\frac{1}{2}\left(x^2+9x-36\right)$. Which pair of expressions could represent the base and height of the right triangle?

    A. $x+6,\ x-6$
    B. $x+9,\ x-4$
    C. $x+12,\ x-3$
    D. $x+18,\ x-2$

20. When 36 is subtracted from the square of a number, the result is five times the number. What is the positive solution?

    A. 9
    B. 6
    C. 3
    D. 4