SOLVING QUADRATIC EQUATIONS (DAY 1)

UADRATIC EQUATION:

General Quadratic Equation:

RD FORM of a quadratic equation: **STAN**

OW TO SOLVE QUADRATIC EQUATIONS:

Step 1: Write equation in Standard Form.

Step 2: Factor the quadratic equation

Step 3: After the problem has been factored we will complete a step called the "T" step. Create a T separating the two ( ).

Step 4: Once ( ) are separated, set each ( ) = to 0 and solve for the variable.

Step 5: Check each of the roots in the **ORIGINAL** quadratic equation

Name:_____ Period:____

1.4 Quadratics Practice

Solve each equation. Check the roots.

1. Find the roots: $r^2 - 12r + 35 = 0$

2. Solve for y: $y^2 + 11y + 24 = 0$

3. Find the roots: $x^2 - 5x - 6 = 0$

4. Solve for y: $y^2 - 3y = 28$

5. Find the roots: $x^2 = x + 30$

6. Find the roots: $3x^2 - 3x = 7x - 3$

Solve the following equations. Check all the roots:

7. $z^2 - 4 = 0$

8. $a^2 - 36 = 0$

9. $x^2 = -4x$

10. $x^2 + 8x = 0$

11. $3x^2 - 12 = 0$

12. $5y^2 = 45$

13. Solve for x: $x(x + 3) = 40$

14. Solve for x: $\frac{x}{5} = \frac{3}{x + 2}$

15. Solve for x: $\frac{3x}{4} = \frac{x^2}{8}$

Review of Consecutive Integers "Let Statements"

Integers

Consecutive Integers

Consecutive Even Integers

Consecutive Odd Integers

16. When the square of a certain number is diminished by 9 times the number the result is 36. Find the number.

17. A certain number added to its square is 30. Find the number.

18. The square of a number exceeds the number by 72. Find the number.

19. Find two positive numbers whose ratio is 2:3 and whose product is 600.

20. The product of two consecutive odd integers is 99. Find the integers.

21. Find two consecutive positive integers such that the square of the first is decreased by 17 equals 4 times the second.

22. The ages of three family children can be expressed as consecutive integers. The square of the age of the youngest child is 4 more than eight times the age of the oldest child. Find the ages of the three children.

23. Find three consecutive odd integers such that the square of the first increased the product of the other two is 224.

Remember:

- Draw a picture and Write a "Let" statement
- Write an equation
- Solve the equation (REMEMBER: YOU CAN'T HAVE A NEGATIVE LENGTH)
- Check to see if your solution makes sense
- Re-Read the problem to make sure you answered the question

24. The ratio of the measures of the base and the altitude of a parallelogram is 3:4. The area of the parallelogram is 1,200 square centimeters. Find the measure of the base and altitude of the parallelogram.

25. The altitude of a triangle is 5 less than its base. The area of the triangle is 42 square inches. Find its base and altitude.

26. The length of a rectangle exceeds its width by 4 inches. Find the dimensions of the rectangle it its area is 96 square inches.

27. If the measure of one side of a square is increased by 2 centimeters and the measure of the adjacen side is decreased by 2 centimeters, the area of the resulting rectangle is 32 square centimeters. Find the measure of one side of the square.

28. 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.

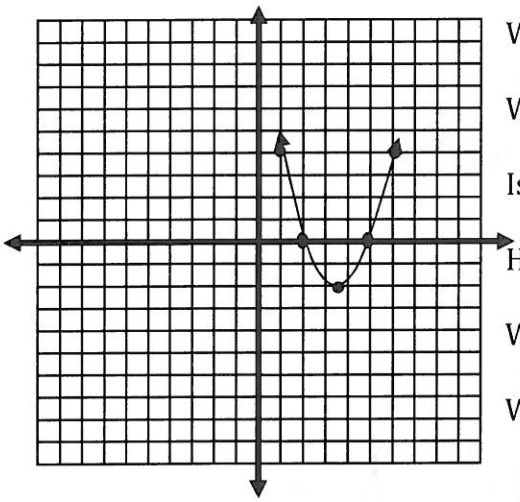
29.In a trapezoid, the smaller base is 3 more than the height, the larger base is 5 less than 3 times the height, and the area of the trapezoid is 45 square centimeters. Find, in centimeters, the height of the trapezoid.

30. If the length of one side of a square is tripled and the length of an adjacent side is increased by 10, the resulting rectangle has an area that is 6 times the area of the original square. Find the length of a side of the original square.

31. The length of a rectangle is 7 units more than its width. If the width is doubled and the length is increased by 2, the area is increased by 42 square units. Find the dimensions of the original rectangle.

32. The side of one square is 2 centimeters longer than the side of the second square. If the sum of their areas is $100cm^2$, find the length of the side of each square.

33. Given the following graph of the equation $y = x^2 - 7x + 10$. Answer the following questions.



What is the axis of symmetry? _____

What are the coordinates of the turning point?_____

Is the T.P. a max or minimum point? _____

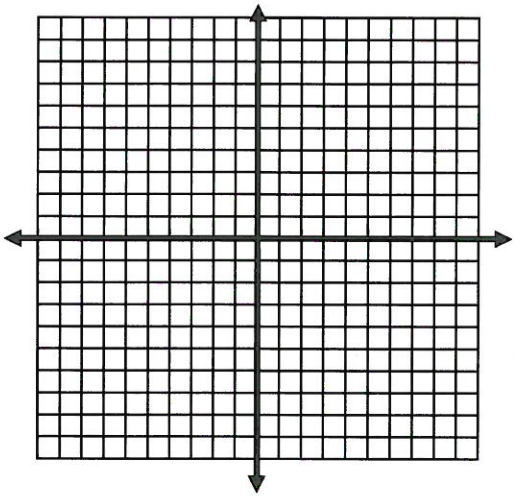
How many roots are there?_____

What are the solutions of this equation? ____

What are the solutions called? _____

Now, solve the equation: $0 = x^2 - 7x + 10$

34. GRAPH: $y = -x^2 - 6x - 5$



What is the axis of symmetry? _____

What are the coordinates of the turning point?_____

Is the T.P. a max or minimum point? _____

How many roots are there?_____

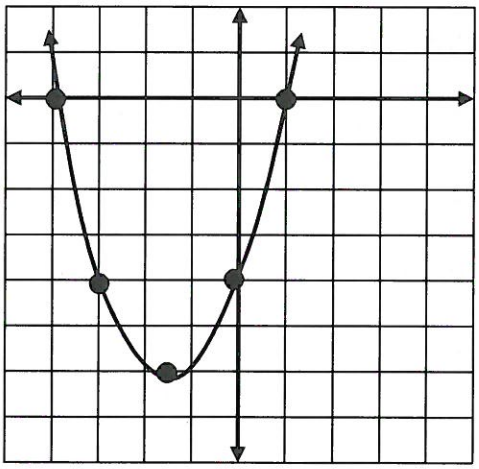
What are the solutions of this equation? _____

What do you call these solutions? _____

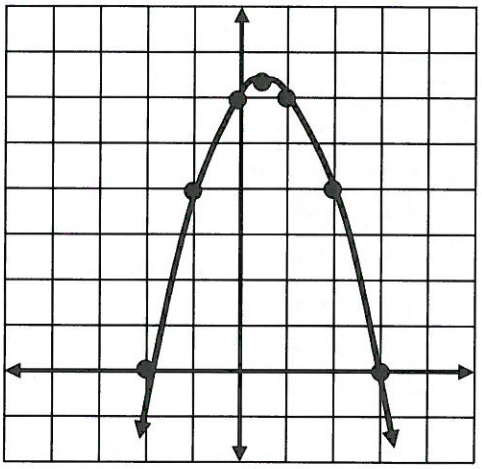
Now try to solve the above equation algebraically! How do we do this?

Write an equation for each graph below.

35.



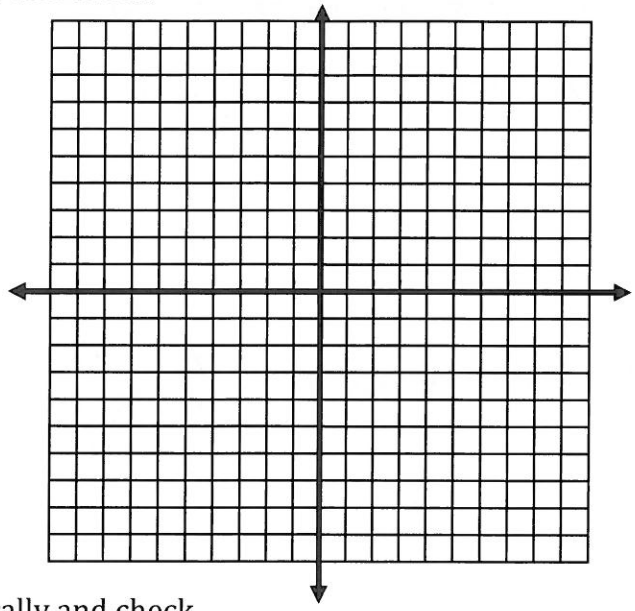
36.



Examples:

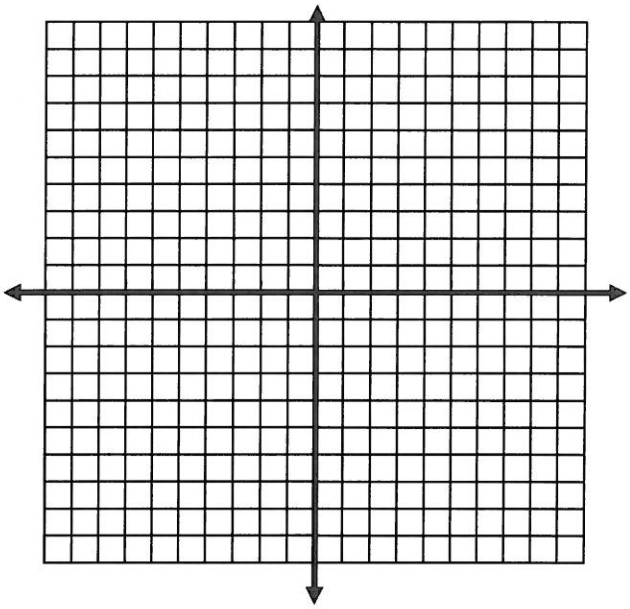
37. Solve the following system of equations graphically and check.

$$y = -x^2 + 4x - 3$$
$$x + y = 1$$



38. Solve the following system of equations graphically and check.

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



39. The graphs of the equations $y = x^2$ and $x = 2$ intersect in:

(1) 1 point (2) 2 points (3) 3 points (4) 4 points

40. Which is a solution or the following system of equations?

$$y = 2x - 15$$
$$y = x^2 - 6x$$

(1) $(3, -9)$ (2) $(0, 0)$ (3) $(5, 5)$ (4) $(6, 0)$

41. When the graphs of the equations $y = x^2 - 5x + 6$ and $x + y = 6$ are drawn on the same set of axes, at which point do the graphs intersect?

(1) (4, 2) (2) (5, 1) (3) (3, 3) (4) (2, 4)

42. Solve the following system:

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

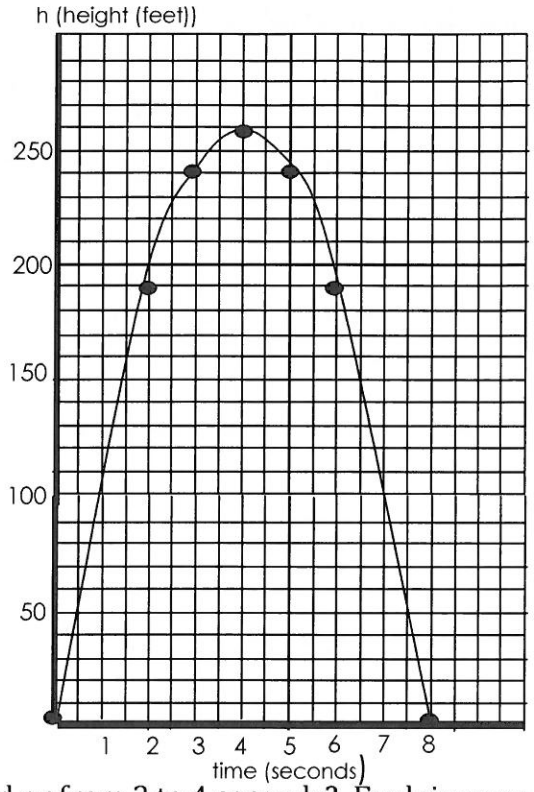
43. Find the solutions of:

$$y = -x^2 + 4x - 3$$
$$x + y = 1$$

44. Solve for the solutions:

$$y = x^2 - 7x + 13$$
$$x - y = 2$$

Using the graph at the right, It shows the **height *h*** in feet of a small rocket ***t* seconds** after it is launched. The path of the rocket is given by the equation:
$h = -16t^2 + 128t$.



45. How long is the rocket in the air? _____

46. What is the greatest height the rocket reaches? ___

47. About how high is the rocket after 1 second? _____

48. After 2 seconds,
    a. about how high is the rocket?_____

    b. is the rocket going up or going down? _____

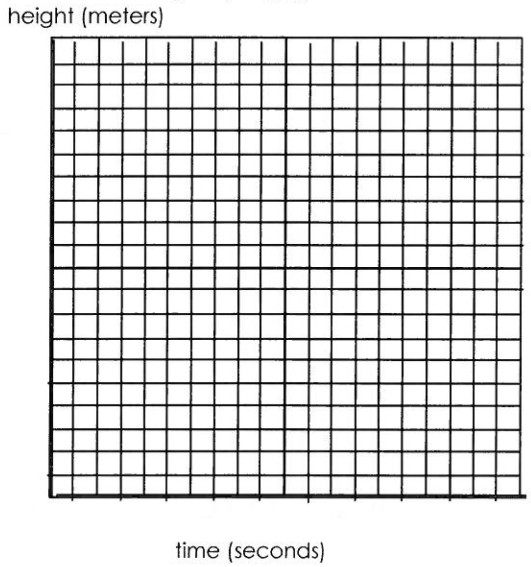
49. After 6 seconds,
    a. about how high is the rocket? _____

    b. is the rocket going up or going down? _____

50. Do you think the rocket is traveling faster from 0 to 1 second or from 3 to 4 seconds? Explain your vanswer.

51. Using the equation, find the **exact** value of the height of the rocket at 2 seconds.

52. A ball is thrown in the air. The path of the ball is represented by the equation **$h = -t^2 + 8t$**. Graph the equation over the interval **$0 \le t \le 8$** on the accompanying grid.



What is the maximum height of the ball?_____

How long is the ball above 7 meter? _____

53. Things to remember when completing quadratic application word problems:

t is_____. It represents __. **h** or d is _____/distance. It represents __.

When an object hits the **ground** (water), its height **= 0**.

54. After *t* seconds, a ball tossed in the air from the ground level reaches a height of *h* feet given by the equation $\mathbf{h = 144t - 16t^2}$.

a. What is the height of the ball after 3 second?

b. What is the maximum height the ball will reach?

c. Find the number of seconds the ball is in the air when it reaches a height of 224 feet.

d. After how many seconds will the ball hit the ground before rebound?

55. A rocket carrying fireworks is launched from a hill 80 feet above a lake. The rocket will fall into lake after exploding at its maximum height. The rocket's height above the surface of the lake is given by
$\mathbf{h = -16t^2 + 64t + 80}$.

a. What is the height of the rocket after 1.5 second?

b. What is the maximum height reached by the rocket?

c. How long will it take for the rocket to hit 128 feet?

d. After how many seconds after it is launched will the rocket hit the lake?

56. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground t seconds after it is thrown is given by
$d = -16t^2 - 4t + 382$. How long after the rock is thrown is it 370 feet from the ground?