

Are there any Homework Questions you would like to see on the board?

pp. 250-252 #3, 4a, 8, 14 _

Today's Learning Goal(s):

By the end of the class, I will be:

- a) Prepared for the unit 4 summative.

Review CheckPoint 4.1

Review SWYK 4.2

Review Unit 3 Summative (& CheckPoints 3.1 & 3.2) (& SWYK 3.1)

p. 250 4. Write the standard form of the quadratic equation.

| | Vertex | y-intercept |
|----|----------|-------------|
| a) | (2, 3) | 11 |
| b) | (-1, 5) | 3 |
| c) | (3, -7) | -43 |
| d) | (-2, -5) | 19 |

$$y = a(x-h)^2 + k$$

$u(h, k)$

$$y = a(x-3)^2 - 7$$

$$-43 = a(0-3)^2 - 7$$

$$-43 = a(-3)^2 - 7$$

$$-43 + 7 = 9a$$

$$-36 = 9a$$

$$\frac{-36}{9} = a$$

$$a = -4$$

$$y = -4(x-3)^2 - 7$$

is the equation.

- p. 252 14. Determine two numbers that add to 39 and multiply to 360. Use a method other than guess and check.

Let x & y represent the two numbers.

$$x + y = 39$$

$$y = 39 - x$$

$$xy = 360$$

$$x(39 - x) = 360$$

$$39x - x^2 = 360$$

$$0 = x^2 - 39x + 360$$

$$= (x - 15)(x - 24)$$

$$\text{if } x = 15$$

$$y = 39 - 15 \\ = 24$$

$$\begin{array}{r} 1 \ 360 \\ 2 \ 180 \end{array}$$

$$360$$

$$15 \ 24$$

$$\text{if } x = 24$$

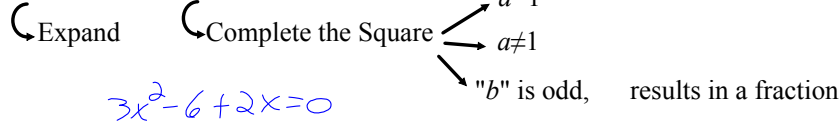
$$y = 39 - 24 \\ = 15$$

Date: Apr-9/19

Recall: Three forms of a **quadratic relation:**

| Vertex Form | Standard Form | Factored Form |
|--------------------|---------------------|-------------------|
| $y = a(x-h)^2 + k$ | $y = ax^2 + bx + c$ | $y = a(x-r)(x-s)$ |

1. Vertex form vs. Standard form



2. The Quadratic Formula (**MUST be memorized**)

↪ make sure a, b, and c are in the correct order

If $ax^2 + bx + c = 0$, then $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

↪ exact answers vs. 3 decimal places (with " \approx " sign)

3. The Discriminant (**NOT** the whole formula, but **MUST be memorized** also)

↪ know the **CONDITIONS**, AND the 2 **types** of questions

The expression $b^2 - 4ac$ is the part under the square root sign and is called the "discriminant". It allows us to determine the "nature of the roots" (number of roots and the type of root).

$b^2 - 4ac > 0 \Rightarrow$ two distinct real solutions (roots) (and 2 x-intercepts)

$b^2 - 4ac = 0 \Rightarrow$ one real solution (root) (and 1 x-intercept)

$b^2 - 4ac < 0 \Rightarrow$ no real solution (roots) (and no x-intercepts)

Type 1: given a quadratic equation or quadratic function

↪ calculate the value (with = signs down the left)

↪ give a 2 part conclusion

Type 2: given a quadratic equation WITH A VARIABLE in the equation

↪ calculate the value of k

↪ Begin WITH THE CONDITION being asked

↪ (NO = signs down the left)

Ex. For what value of k does $f(x) = 3x^2 - 6x + k$ have no real roots?

$b^2 - 4ac < 0$ $a=3 \quad b=-6 \quad c=k$

 $(-6)^2 - 4(3)(k) < 0$

 $36 - 12k < 0$

 $-12k < -36$

 $-12k < -36 \rightarrow -12k < -36$

 $k > \frac{-36}{-12}$

 $k > 3$

4. Solving problems

↪ What is being asked? Do we need the vertex of the zeros?

↪ use quadratic formula vs. other methods

↪ compare using last days solutions to p. 240 #7 (on next screen)

$k = \frac{-b}{2a}$

5. Determining the equation

↪ What information is given? What form should we start with?

- p. 240 7. The profit of a shoe company is modelled by the quadratic function $P(x) = -5(x - 4)^2 + 45$, where x is the number of pairs of shoes produced, in thousands, and $P(x)$ is the profit, in thousands of dollars. How many thousands of pairs of shoes will the company need to sell to earn a profit?

$$\text{Let } P(x) = 0$$

$$0 = -5(x-4)^2 + 45$$

Option 1:

$$0 = -5(x^2 - 8x + 16) + 45$$

$$= -5x^2 + 40x - 80 + 45$$

$$= -5x^2 + 40x - 35$$

$$a = -5 \quad b = 40 \quad c = -35$$

$$x = \frac{-40 \pm \sqrt{40^2 - 4(-5)(-35)}}{2(-5)}$$

$$= \frac{-40 \pm \sqrt{900}}{-10}$$

$$= \frac{-40 \pm 30}{-10}$$

$$x = \frac{-40 + 30}{-10} \quad \text{or} \quad x = \frac{-40 - 30}{-10}$$

$$= \frac{-10}{-10} \quad = \frac{-70}{-10}$$

$$= 1 \quad = 7 \quad \rightarrow$$

$\therefore x = 1000$ or $x = 7000$ pairs of shoes to break even (= 0 profit)

Option 2:

$$-45 = -5(x-4)^2$$

$$\frac{-45}{-5} = (x-4)^2$$

$$9 = (x-4)^2$$

$$\pm\sqrt{9} = x-4$$

$$4 \pm 3 = x$$

$$x = 4 + 3 \quad \text{or} \quad x = 4 - 3$$

$$x = 7 \quad = 1$$

$\therefore 1000$ or 7000 pairs of shoes breaks even.

\therefore sell 1001 pairs to make a profit

Today's Homework:

Review pp. 254-255 #1 - 10