# Quiz Monday

*Key*

Know all the methods for solving and when to use each method:
- Factoring
- Graphing
- Complete the Square
- Quadratic Formula *(YOU MUST MEMORIZE IT!!!!!)*

***Know how to go from standard form to vertex form and intercept form (see green homework)***
- 1 real world discriminant question
- 2 real world problems

## Solve the following each of the four ways
$$2x^2 - 6x = 8$$

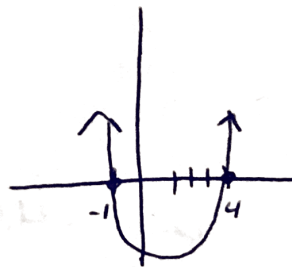| Factoring | Complete the Square |
|---|---|
| *Factor out the GCF first!* $$2x^2 - 6x - 8 = 0$$ $$2(x^2 - 3x - 4) = 0$$ $$2(x-4)(x+1) = 0$$ $$\boxed{X = 4 \text{ or } x = -1}$$ | *divide everything by 2 first* $$x^2 - 3x = 4$$ $$x^2 - 3x + \boxed{2.25} = 4 + \boxed{2.25}$$ $$(X - 1.5)^2 = 6.25$$ $$X = 1.5 \pm 2.5$$ $$\boxed{X = 4 \text{ or } X = -1}$$ |
| **Quadratic Formula** $$\frac{-(-3) \pm \sqrt{9 - 4(1)(-4)}}{2(1)}$$ $$\frac{3 \pm \sqrt{25}}{2}$$ $$\frac{3 \pm 5}{2} \to \boxed{\begin{array}{c}4\\-1\end{array}}$$ | **Graphing** (SKETCH a picture of it- label the x-intercepts)  |

When is the square root method the best? when it is already factored and/or b is zero

When is factoring the best method? when you can easily see the factors

When is completing the square a good method? when a is 1 and b is even

When is the quadratic formula the best method? when factoring doesn't work

When is graphing the best method? when all else fails
(There is a back!)

Match which method is best to use for the following four equations. You can only use each method once.
Then solve each equation.

a. Square Root Method    b. Factoring    c. Completing the Square    d. Quadratic Formula

1. $7x^2 - 5x - 5 = 0$ ___D___

$$\frac{-(-5) \pm \sqrt{25 - 4(7)(-5)}}{2(7)}$$

$$\boxed{\frac{5 \pm \sqrt{165}}{14}}$$

3. $8x^2 + 9x + 2 = 1$ ___B___

$$8x^2 + 8x + x + 1 = 0$$
$$8x(x+1) + 1(x+1) = 0$$
$$(8x+1)(x+1) = 0$$

$$\boxed{x = -\tfrac{1}{8} \quad x = -1}$$

2. $x^2 + 12x = 5$ ___C___

$$x^2 + 12x + \boxed{36} = 5 + \boxed{36}$$
$$(x+6)^2 = 41$$

$$\boxed{x = -6 \pm \sqrt{41}}$$

4. $36x^2 - 64 = 0$ ___A___

$$36x^2 = 64$$
$$x^2 = \frac{64}{36}$$
$$x = \pm \frac{8}{6}$$

$$\boxed{x = \pm \frac{4}{3}}$$

5. The height above the ground in meters of a model rocket on a particular launch can be modeled by the equation $h(t) = -4.9t^2 + 102t + 100$, where $t$ is the time in seconds after its engine burns out $100$ m above the ground. Will the rocket reach a height of $600$ m? Use the <u>discriminant</u> to explain your answer.

$$600 = -4.9t^2 + 102t + 100$$
$$0 = -4.9t^2 + 102t - 500$$
$$(102)^2 - 4(-4.9)(-500)$$
$$604 \quad \boxed{\text{yes!}}$$

6. Your friend tosses a ball in the air. The equation $h(t) = -8t^2 + 18t + 5$ models the height of the ball $t$ seconds after it was thrown.

a. How long was the ball in the air? Factor to solve.

$$0 = -8t^2 + 18t + 5$$
$$0 = -1(8t^2 - 18t - 5)$$
$$0 = -1(4t + 1)(2t - 5)$$

$$\boxed{\begin{array}{l} t = -\tfrac{1}{4} \\ t = 5/2 \end{array}}$$

b. How high did the soccer ball get? Use any method.

$$\frac{-18}{2(-8)} = \frac{-18}{-16} = 1.125 \qquad 1.125, \boxed{15.125} \text{ feet}$$