

Lesson#1 2/1/2018 MES44QCS-09

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MES44QCS-Lesson 1

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Aim: How can we solve more difficult Quadratic Equations that are not in standard form?

Do Now:

1) Which equation is in standard form?

a. $8x^2 - 7x + 1 = 0$ (circled in red)

b. $8x^2 = 7x + 1$

c. $(x-1)(2x+3) = 1$

Handwritten work for (a): $8x^2 - 7x - 1 = 0$

Handwritten work for (b): $(x-1)(2x+3)$

Handwritten work for (c): $2x^2 + 3x - 3 - 1 = 0$
 $2x^2 + 3x - 3$
 $\underline{-2x}$
 $2x^2 + x - 3 = 1$

2) Find the solutions by factoring

a. $7k^2 + 9k = 0$

b. $m^2 - 9m + 8 = 0$ (circled in blue)

Handwritten work for (a): $k = 0$ $k = -\frac{9}{7}$

Handwritten work for (b):

| | | |
|----|----|----|
| -8 | -9 | -1 |
| 8 | | |

| | |
|----|---------|
| m | (m - 1) |
| -8 | -8 |
| | +8 |

$\Rightarrow (m-1)(m-8) = 0$

$m-1=0$ $m-8=0$

$m=1$ $m=8$

I- Standard Form Quadratic Equations

1) $Y = ax^2 + bx + c$ OR $ax^2 + bx + c = 0$

2) Geometric Interpretation of a quadratic equation

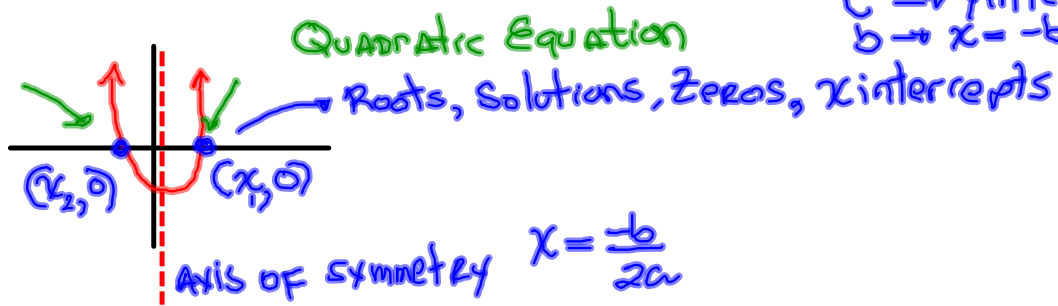
a. How does the solution look like in a graph?

Parabola

a → WIDE/NARROW
 → UP/DOWN

b. How does the equation help me predict the shape of the graph?

c → y intercept
 b → $x = -b/2a$



II - **Non-Standard Form Quadratic Equations**

1) $(x-1)(2x+3) = 1$ - how do you find the solution? Let's use the calculator

2) $8x^2 + 7x + 1 = 0$ let's use the calculator and factoring to solve

$(x-1)(2x+3) - 1 = 0$
 $2x^2 + 3x - 3 - 1 = 0$
 $2x^2 + 3x - 4 = 0$

$2x^2 + 3x - 3$
 $\underline{-2x}$
 $2x^2 + x - 3 - 1 = 0$
 $2x^2 + x - 4 = 0$

Completing the Square
 factoring.
 formula (Quadratic)
 $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Completing Square

$\frac{2x^2}{2} + \frac{x}{2} - \frac{4}{2} = 0 \Rightarrow x^2 + \frac{x}{2} - 2 = 0$
 $x^2 + \frac{1x}{2} + \frac{1}{16} = 2 + \frac{1}{16}$
 $(x + \frac{1}{4})^2 = 2 + \frac{1}{16}$
 $(x + \frac{1}{4})^2 = \sqrt{2.0625}$
 $x + \frac{1}{4} = \pm \sqrt{2.0625}$

$1.1861 = \sqrt{2.0625 - (1 \div 4)}$

$x = \pm \sqrt{2.0625} - \frac{1}{4}$

$-1.68 = -\sqrt{2.0625 - (1 \div 4)}$

2) $8x^2 + 7x + 1 = 0$ let's use the calculator and factoring to solve

~~$\frac{7}{8}$~~ NO SIKVE

$x = 0.69$ and $x = 0.17$
calculator method.

III- Exercises

1) $x^2 = 7x + 18$

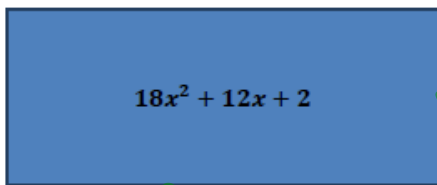
2) $p^2 - 5p = 14$

- ① Place them in STANDARD FORM
- ② USE CALCULATOR
- ③ try to factor .

$$3) -31x = 20 - 7x^2 \quad \begin{cases} -31x = 20 - 7x^2 \\ 7x^2 - 31x - 20 = 0 \quad (\text{STANDARD FORM}) \end{cases}$$

$$4) 7x^2 - 45x - 28 = 0 \quad \text{on your own}$$

5) The area of the rectangle below is represented by the expression $18x^2 + 12x + 2$ square units. Write two expressions to represent the dimensions, if the length is known to be twice the width.



$$18x^2 + 12x + 2$$

$$6x+2$$

$$3x+1$$

$$18x^2 + 12x + 2 = 0$$

$$\begin{array}{r} 12 \\ 6 \times 6 \\ \hline 36 \end{array}$$

| | | |
|------|----------|------|
| | $6x + 2$ | |
| $3x$ | $18x^2$ | $6x$ |
| $+1$ | $6x$ | 2 |

$$*(6x+2)(3x+1) = 0$$