Notes on Quadratic Equations

SOL 6

In Algebra I, you learned how to solve simple quadratic equations. First, a quadratic equation is one which contains a squared term. The equations below are quadratic:

$$x^2 - 5x + 4 = 0$$
$$6x^2 - 5x + 1 = 0$$
$$2x^2 - 7x + 1 = 0$$

Quadratic equations need not equal 0. However, if the equation does not equal 0, you must add or subtract to make it equal 0.

There are 4 ways to solve quadratic equations:
1. Graphing
2. Factoring
3. Use the quadratic formula
4. Completing the square

.

Method 1—Graphing

Let's do **$x^2 - 5x + 4 = 0$**.

Using the calculator, put the equation into the y= window so you can graph it. Ignore the 0. You will have y = x^2 – 5x + 4. Now press "Graph" and see the figure formed. It looks like a U and is called a "**parabola**."

Notice that it crosses the x-axis at the points
_____.

The answers to the problem are
 x = ___ and   x = ____.

You could have also gone to Table (2nd graph) on the calculator and found the answer in the table. To find the answer using this method,
you would look in the y-column of the table for "0."
The corresponding x-value would be the answers.

Follow along on this second example:
$$x^2 - 3x = 10$$

Change to:
$$x^2 - 3x - 10 = 0$$

When you graph this equation, you will notice that the parabola crosses the x-axis at _____ and _____ These are your two answers.

Do these to make sure you can find the correct answers.

1. $x^2 + 4x - 32 = 0$

2. $6x^2 - x - 1 = 0$

Method 2—Factoring

When a problem cannot be solved by graphing, factoring is a second option. In problem 2 above, the graph indicates that there are two solutions but they are difficult to see on the graph and they can not be located in the table

The next option is to factor the trinomial.
$$6x^2 - x - 1 = 0$$

Set each factor equal to 0.

$3x + 1 = 0$ $2x - 1 = 0$

Solve each equation. You should get $-1/3$ and ½.

Let's try another one.

$$15x^2 - 14x - 8 = 0$$

Now do these to test your knowledge.

    1. $25x^2 - 49 = 0$

    2. $2x^2 - 3x - 4 = 0$

Method 3—Quadratic Formula

To solve a quadratic equation using this method you must first *KNOW* the formula. On the day of the quiz, you need to know this formula. It is :

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Each of the letters represents a number from the equation on which you are working:
           a represents the coefficient of x^2

           b represents the coefficient of x

           c represents the plain number

In the examples below, you should identify each number in the equation before using the formula.

So, let's do problem 4 above:

$2x^2 - 3x - 4 = 0$

.
x =

Now let's do one more.

$4a^2 + 8a - 13 = 0$

Now do these

1. $x^2 - 2x - 6 = 0$

2. $3x^2 + 10x + 4 = 0$

3. $12x^2 - 43 = 0$

Assignment

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