

In an earlier chapter we studied linear equations which have a standard form of:

This chapter concentrates on quadratic equations which have the standard form of:

A quadratic equation simply means that (in general) the highest power that the variable in the problem is raised to is a 2. That is, it is a "second-degree" equation in one variable.

We will be using a variety of methods to solve these quadratic equations:

1. FACTORING (THIS IS A REVIEW)
2. THE SQUARE ROOT PROPERTY
3. COMPLETING THE SQUARE
4. THE QUADRATIC FORMULA

M117 SECTION 11.1 SQUARE ROOT PROPERTY & COMPLETING THE SQUARE

METHOD 1 - FACTORING

$$x^2 = 81$$

METHOD 2 - SQUARE ROOT PROPERTY

$$x^2 = 81$$

THE SQUARE ROOT PROPERTY

If $a^2 = b$, then $a = \underline{\hspace{2cm}}$ or $a = \underline{\hspace{2cm}}$

We can use this property ONLY WHEN THE VARIABLE APPEARS ONCE IN THE PROBLEM.

Now, solving the following will be a bit quicker and easier. Isolate the "square portion" and then root each side.

$$x^2 - 40 = 0$$

$$\frac{3}{4}x^2 - 5 = 3$$

Let's elaborate. Isolate the "square portion", then square root each side.

$$(3n+1)^2 = 25$$

$$(4y+5)^2 = 80$$

METHOD 3 - COMPLETING THE SQUARE

We use this method to rewrite a quadratic equation so that it looks like the above 2 examples and then apply the SQUARE ROOT PROPERTY.

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

1. This equation does not factor.
2. Move the constant term to the right side of equation.
3. Find the "perfect" constant to add on - this is the square of half the coefficient of the x-term. Add this value to **BOTH SIDES**. Simplify.
4. Factor the left side of the equation. Write as:
 $(x \pm a)^2$
5. Solve using the SQUARE ROOT PROPERTY
Simplify.

$$x^2 - 7x - 1 = 0$$

1. This equation does not factor.
2. Move the constant term to the right side of equation.
3. Find the "perfect" constant to add on - this is the square of half the coefficient of the x-term. Add this value to **BOTH SIDES**. Simplify.
4. Factor the left side of the equation. Write as:
 $(x \pm a)^2$
5. Solve using the SQUARE ROOT PROPERTY
Simplify.

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

1. This equation does not factor.
2. Move the constant term to the right side of equation.
3. Find the "perfect" constant to add on - this is the square of half the coefficient of the x-term. Add this value to **BOTH SIDES**. Simplify.
4. Factor the left side of the equation. Write as:
 $(x \pm a)^2$
5. Solve using the SQUARE ROOT PROPERTY
Simplify.