Special Cases of Quadratic Equations



Recall: We have learned that a TRINOMIAL quadratic equation can be solved by

- 1- Factoring
- 2- Using the Quadratic Formula

$$ax^2 + bx + c = 0$$

What if the quadratic was not a trinomial?

Ex.1. Solve.

a)
$$x^{2} + 2x = 0$$

$$x(x+7) = 0$$

$$x = 0$$

$$x + 2 = 0$$

$$x = -7$$

b)
$$x^2 - 36 = 0$$

 $(x+6)(x-6) = 0$
 $x+6=0$ or $x-6=0$
 $x=6$

Taking the Square Root of a Variable

Evaluate the following:

(a)
$$\sqrt{4} = 2$$

(b)
$$\sqrt{81} = 9$$

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$$\sqrt{4} = 2$$
 (b) $\sqrt{81} = 9$ (c) $\sqrt{17} = 4.123$

Now consider:

(a)
$$\sqrt{x^2} = \pm 2$$
 (b) $\sqrt{9y^2} = \pm 3y$

Reconsider $x^2 - 36 = 0$

$$\chi^2 = 36$$

$$\sqrt{\chi^2} = \pm \sqrt{36}$$

$$\alpha = \pm 6$$

$$\frac{\pm x = 6}{x = 6}$$

Ex.2. Solve.

a)
$$4x^2 - 5 = 0$$

$$z^2 = \frac{5}{4}$$

$$x = \pm \sqrt{\frac{5}{4}}$$

b)
$$2x^2 + 16 = 0$$

$$2\pi^2 = -16$$

$$x = \pm \sqrt{-8}$$

 $x = \pm \sqrt{-8}$ does not exist
(DUE)

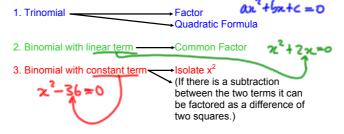
c)
$$2(x+3)^2 - 7 = 0$$

 $2(x+3)^2 = 7$
 $(x+3)^2 = 7$
 $x+3 = \pm \sqrt{7}$
 $x = -3 \pm \sqrt{7}$
 $x = -3 + \sqrt{7}$
 $x = -1.129$
 $x = -4.122$

Summary:

Below are some strategies to help us solve quadratic equations more efficiently.

4. $(x \pm h)^2$ term \longrightarrow Isolate $(...)^2$



Assigned Work

p. 343 # 3, 4, 5cd

On a blank piece of paper, make up the following 4 types of quad equations and solve.

- 1- Binomial equation with linear term: $ax^2 \pm bx = 0$
- 2- Binomial equation with constant term: $ax^2 \pm c = 0$
- 3- Equation: $a(x h)^2 + k = 0$
- 4- Trinomial: $ax^2 \pm bx \pm c = 0$

$$\begin{array}{ll}
9.343 \\
3(d) & x(x-2) = 36 - 2x \\
x^2 - 2x = 36 - 2x \\
+ 2x - 36 + 2x \\
- 36 \\
x^2 - 36 = 0
\end{array}$$

$$(x-6)(x+6) = 0 \qquad x^2 = 36$$

$$x = 6 \text{ as } x = 1$$

$$4(a) (x+1)^{2}-1b=0$$

$$(x+1)^{2}=1b$$

$$x+1=\pm 4$$

$$x=-1\pm 4$$

$$x=-5 \text{ or } x=3$$

$$416) -2(x+5)^{2} + 2 = 0$$

$$-2(x+5)^{2} = -2$$

$$-2 -2$$

$$(x+5)^{2} = 1$$

$$x+5 = \pm 1$$

$$x = -5 \pm 1$$

$$x = -4 \text{ on } x = -6$$

$$5(c) \quad \chi^{2} - 16 = 0 \qquad \chi^{2} + 0\chi - 16 = 0$$

$$a = 1 \quad c = -16$$

$$b = 0 \qquad (\chi - 4)(\chi + 4) = 0$$

$$\chi = -\frac{6 \pm \sqrt{5^{2} - 4ac}}{2}$$

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

$$= \pm \sqrt{64}$$

$$= \pm \sqrt{8}$$

$$\chi = 4 \text{ or } \chi = -4$$