

\*\*When we are asked to solve a quadratic equation, we are really being asked to find the roots.\*\*  
 use quad. formula

x-intercepts  
 zeros  
 solutions

Ex.5) Use factoring to solve the following quadratic functions.

a)  $10x^2 + 13x - 3 = 0$

$$10x^2 + 13x - 3 = 0$$

$$(5x - 1)(2x + 3) = 0$$

$$5x - 1 = 0 \quad 2x + 3 = 0$$

$$5x = 1 \quad 2x = -3$$

$$x = \frac{1}{5} \quad x = -\frac{3}{2}$$

b)  $5x^2 - 45 = 0$

$$5(x^2 - 9) = 0$$

$$5(x + 3)(x - 3) = 0$$

$$x + 3 = 0 \quad x - 3 = 0$$

$$x = -3 \quad x = 3$$

c)  $8x^2 - 2x - 18 = 0$

$$8x^2 - 2x - 18 = 0$$

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

$$2x + 1 = 0 \quad 4x - 3 = 0$$

$$2x = -1 \quad 4x = 3$$

$$x = -\frac{1}{2} \quad x = \frac{3}{4}$$

d)  $6x^2 + 3x - 3 = 0$

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

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

$$2x - 1 = 0 \quad x + 1 = 0$$

$$2x = 1 \quad x = -1$$

$$x = \frac{1}{2} \quad x = -1$$

Ex.6) Use the square root method to solve the following quadratic functions.

a)  $\sqrt{(5x - 1)^2} = \sqrt{12}$

$$5x - 1 = \pm\sqrt{12}$$

$$5x - 1 = \pm 2\sqrt{3}$$

$$5x = 1 \pm 2\sqrt{3}$$

$$x = \frac{1 \pm 2\sqrt{3}}{5}$$

b)  $\sqrt{(x + 3)^2} = \sqrt{18}$

$$x + 3 = \pm\sqrt{18}$$

$$x + 3 = \pm 3\sqrt{2}$$

$$x = -3 \pm 3\sqrt{2}$$

c)  $x^2 + 10x + 25 = 121$

$$(x + 5)(x + 5) = 121$$

$$\sqrt{(x + 5)^2} = \sqrt{121}$$

$$x + 5 = \pm 11$$

$$x = -5 \pm 11$$

$$x = 6 \quad x = -16$$

d)  $x^2 + 6x + 9 = 8$

$$\sqrt{(x + 3)^2} = \sqrt{8}$$

$$x + 3 = \pm\sqrt{8}$$

$$x + 3 = \pm 2\sqrt{2}$$

$$x = -3 \pm 2\sqrt{2}$$

Ex.7) Use completing the square to solve the following quadratic functions.

a)  $x^2 + 2x - 14 = 0$

$$x^2 + 2x + 1 - 14 - 1 = 0$$

$$(x + 1)^2 - 15 = 0$$

$$\sqrt{(x + 1)^2} = \sqrt{15}$$

$$x + 1 = \pm\sqrt{15}$$

$$x = -1 \pm \sqrt{15}$$

b)  $2x^2 - 8x - 13 = 7$

$$2x^2 - 8x - 20 = 0$$

$$2(x^2 - 4x + 4) - 20 - 8 = 0$$

$$2(x - 2)^2 - 28 = 0$$

$$2(x - 2)^2 = 28$$

$$(x - 2)^2 = 14$$

$$x - 2 = \pm\sqrt{14}$$

$$x = 2 \pm \sqrt{14}$$

c)  $-x^2 - 2x + 5 = 0$

$$-x^2 - 2x + 5 = 0$$

$$-(x^2 + 2x + 1) + 5 + 1 = 0$$

$$-(x + 1)^2 + 6 = 0$$

$$-(x + 1)^2 = -6$$

$$(x + 1)^2 = 6$$

$$x + 1 = \pm\sqrt{6}$$

$$x = -1 \pm \sqrt{6}$$

d)  $-2x^2 + 6x + 9 = 0$

$$-2x^2 + 6x + 9 = 0$$

$$-2(x^2 - 3x + \frac{9}{4}) + 9 + \frac{18}{4} = 0$$

$$-2(x - \frac{3}{2})^2 + \frac{27}{2} = 0$$

$$-2(x - \frac{3}{2})^2 = -\frac{27}{2}$$

$$(x - \frac{3}{2})^2 = \frac{27}{4}$$

$$x - \frac{3}{2} = \pm\sqrt{\frac{27}{4}}$$

$$x = \frac{3}{2} \pm \frac{3\sqrt{3}}{2}$$