

Solving Quadratic Equations using Square Roots

isolate x^2 !

Ex. 1 Solve the equation using two methods.

$$x^2 - 7 = 9$$

FACTORIZING

$$x^2 - 7 = 9$$

$$x^2 - 16 = 0$$

$$(x+4)(x-4) = 0$$

$$x+4=0 \quad x-4=0$$

$$x = -4 \quad x = 4$$

USING SQUARE ROOTS

$$x^2 - 7 = 9$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = \pm 4$$

Ex. 2

Solve each equation using square roots.

a. $4r^2 - 7 = 9$

$$\frac{4r^2}{4} = \frac{16}{4}$$

$$\sqrt{r^2} = \sqrt{4}$$

$$r = \pm 2$$

b. $\frac{36x^2}{36} = \frac{121}{36}$

$$\sqrt{x^2} = \sqrt{\frac{121}{36}}$$

$$x = \pm \frac{11}{6}$$

$$c. 7x^2 - 8 = 13$$

$$\frac{7x^2}{7} = \frac{21}{7}$$

$$\sqrt{x^2} = \sqrt{3}$$

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

exact

(no rounded decimals)

$$d. 4z^2 + 7 = 12$$

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

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

$$z = \pm \frac{\sqrt{5}}{2}$$

A glimpse of things to come. . .

★ e. $x^2 + 13 = 9$

$$\sqrt{x^2} = \sqrt{-4}$$

$$x = \pm 2i$$

Ex.3 Solve using square roots.

a. $(x+2)^2 = 10$

$$\sqrt{(x+2)^2} = \sqrt{10}$$

$$x+2 = \pm \sqrt{10}$$

$$x = -2 \pm \sqrt{10}$$

b. $\frac{2(x-3)^2}{2} = \frac{18}{2}$

$$\sqrt{(x-3)^2} = \sqrt{9}$$

$$x-3 = \pm 3$$

$$x = 3 \pm 3$$

$$x = 3 + 3$$

$$x = 3 - 3$$

$$x = 6$$

$$x = 0$$