

Solving Quadratic Equations Using the Quadratic Formula

EX3. $m^2 - 5m - 14 = 0$

EX4. $x^2 - 4x = -9$

EX5. $8m^2 - 18 = 4m$

$a = 1$
 $b = -4$
 $c = 9$

$x^2 - 4x + 9 = 0$

$$X = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(9)}}{2(1)}$$

$$X = \frac{4 \pm \sqrt{-20}}{2}$$

20
 $\swarrow \searrow$
 $\cancel{2} \quad 10$
 $\swarrow \searrow$
 $5 \quad \cancel{2}$

$2\sqrt{5}$

$$X = \frac{4 \pm 2i\sqrt{5}}{2}$$

$$X = 2 \pm i\sqrt{5}$$

Use Quadratic Equations to Solve Real-World Problems

17. A toy rocket is launched upward from ground level. Its height h after t seconds is given by the equation $h = -16t^2 + 128t$.

a. What height is rocket after 3 seconds?

$$h = -16(3)^2 + 128(3) = 240 \text{ ft}$$

b. When will the rocket hit ground? $= 0$

$$a = -16 \quad b = 128 \quad c = 0$$

$$0 = -16t^2 + 128t \quad X = \frac{-128 \pm \sqrt{(128)^2 - 4(-16)(0)}}{2(-16)}$$

c. What is the maximum height the rocket will reach?

$$X = \frac{-b}{2a} = \frac{-128}{2(-16)} = 4 \text{ s} \quad X = 0 \quad X = 8$$

$$h = -16(4)^2 + 128(4) = 256 \text{ ft}$$