

2.5 Solve Polynomials in Factored Form

Goal • Solve polynomial equations.

Georgia
Performance
Standard(s)

MM1A2f

p.77



ZERO-PRODUCT PROPERTY

Let a and b be real numbers. If $ab = 0$, then $a = 0$ or $b = 0$.

Solve $(x - 5)(x + 4) = 0$.

$$x - 5 = 0$$

$$+ 5 = +5$$

$$x = 5$$

$$x + 4 = 0$$

$$- 4 = -4$$

$$x = -4$$

The solutions of the equation are $-4, 5$.



$$(x + 6)(x - 3) = 0$$

$$x + 6 = 0$$

$$-6 = -6$$

$$x = -6$$

$$x - 3 = 0$$

$$+3 = +3$$

$$x = 3$$

The solutions of the equation are -6, 3.



$$(x - 8)(x - 5) = 0$$

$$x - 8 = 0$$

$$+ 8 = + 8$$

$$x = 8$$

$$x - 5 = 0$$

$$+ 5 = + 5$$

$$x = 5$$

The solutions of the equation are 5, 8.



Solve an equation by factoring

$$3x^2 + 15x = 0$$

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

$$3x = 0$$

$$3$$

$$3$$

$$x = 0$$

$$x + 5 = 0$$

$$-5 = -5$$

$$x = -5$$

The solutions of the equation are -5, 0.



Solve $d^2 - 7d = 0$.

$$d(d - 7) = 0$$

$$d = 0$$

$$x - 7 = 0$$

$$+ 7 = + 7$$

$$x = 7$$

The solutions of the equation are 0, 7.



Solve $9b^2 = 24b$.

$$9b^2 - 24b = 0$$

$$3b(3b - 8) = 0$$

$$3b = 0$$

$$3$$

$$3$$

$$b = 0$$

$$3b - 8 = 0$$

$$+ 8 = +8$$

$$3b = 8$$

$$3$$

$$3$$

$$b = \frac{8}{3}$$

To use the zero-product property, you must write the equation so that one side is 0. For this reason, $24b$ must be subtracted from each side of the equation.

$$0, \frac{8}{3}$$

The solutions of the equation are 0, $\frac{8}{3}$.



Solve $8b^2 = 2b$.

$$8b^2 - 2b = 0$$

$$2b(4b - 1) = 0$$

$$2b = 0$$

$$2$$

$$2$$

$$b = 0$$

$$4b - 1 = 0$$

$$+1 = +1$$

$$4b = 1$$

$$4$$

$$4$$

$$b = \frac{1}{4}$$

$$0, \frac{1}{4}$$



Fountain A fountain sprays water from the ground into the air with an initial vertical velocity of 20 feet per second. After how many seconds does it land on the ground?

Step 1 Write a model for the water's height above ground.

$$h = -16t^2 + vt + s$$

Vertical motion model

$$h = -16t^2 + \underline{20}t + \underline{0}$$

$$v = \underline{20} \text{ and } s = \underline{0}$$

$$h = -16t^2 + \underline{20t}$$

Simplify.

Step 2 Substitute 0 for h . When the water lands, its height above the ground is 0 feet. Solve for t .

$$\underline{0} = -16t^2 + \underline{20t}$$

Substitute _____ for h .

$$\underline{0} = \underline{4t(-4t + 5)}$$

Factor right side.

$$\underline{4t = 0} \text{ or } \underline{-4t + 5 = 0}$$

Zero-product property

$$\underline{t = 0} \text{ or } \underline{-4t = -5}$$

Solve for t .

$$\underline{t = \frac{5}{4}}$$

$$\underline{\frac{5}{4}}$$

The solution $t = 0$ means that before the water is sprayed, its height above the ground is 0 feet.

The water lands on the ground $\frac{5}{4}$ seconds after it is sprayed.



Assignment:

(Change from calendar!)

p. 80 2, 4, 8, 14, 18, 22, 26, 32

