

Solve.

1. $x + 4 = -9$

2. $\frac{4}{3}x = -8$

3. $\frac{1}{2}x = -16$

4. $x - 2 = 25$

5. $\frac{1}{3}x = 11$

6. $x - 4 = 8$

Solve the inequality. Graph the solution.

1. $-7t > 14$

2. $-12 \leq -z$

3. $\frac{n}{-4} \leq 2$

4. $-10 > -\frac{2}{3}m$

5. $12 \geq 6f$

6. $t - 8 \geq 36$

Essential Question

How can you solve a polynomial equation?

Work with a partner. An equation is considered to be in *factored form* when the product of the factors is equal to 0. Match each factored form of the equation with its equivalent standard form and nonstandard form.

Factored Form		Standard Form		Nonstandard Form	
a.	$(x - 1)(x - 3) = 0$	A.	$x^2 - x - 2 = 0$	1.	$x^2 - 5x = -6$
b.	$(x - 2)(x - 3) = 0$	B.	$x^2 + x - 2 = 0$	2.	$(x - 1)^2 = 4$
c.	$(x + 1)(x - 2) = 0$	C.	$x^2 - 4x + 3 = 0$	3.	$x^2 - x = 2$
d.	$(x - 1)(x + 2) = 0$	D.	$x^2 - 5x + 6 = 0$	4.	$x(x + 1) = 2$
e.	$(x + 1)(x - 3) = 0$	E.	$x^2 - 2x - 3 = 0$	5.	$x^2 - 4x = -3$

Work with a partner. Substitute 1, 2, 3, 4, 5, and 6 for x in each equation and determine whether the equation is true. Organize your results in a table. Write a conjecture describing what you discovered.

a. $(x - 1)(x - 2) = 0$

b. $(x - 2)(x - 3) = 0$

c. $(x - 3)(x - 4) = 0$

d. $(x - 4)(x - 5) = 0$

e. $(x - 5)(x - 6) = 0$

f. $(x - 6)(x - 1) = 0$

Work with a partner. The numbers 0 and 1 have special properties that are shared by no other numbers. For each of the following, decide whether the property is true for 0, 1, both, or neither. Explain your reasoning.

- a. When you add to a number n , you get n .
- b. If the product of two numbers is , then at least one of the numbers is 0.
- c. The square of is equal to itself.
- d. When you multiply a number n by , you get n .
- e. When you multiply a number n by , you get 0.
- f. The opposite of is equal to itself.

 **Core Concept****Zero-Product Property**

Words If the product of two real numbers is 0, then at least one of the numbers is 0.

Algebra If a and b are real numbers and $ab = 0$, then $a = 0$ or $b = 0$.

Solve each equation.

a. $2x(x - 4) = 0$

b. $(x - 3)(x - 9) = 0$

Solve the equation. Check your solutions.

1. $x(x - 1) = 0$

2. $3t(t + 2) = 0$

3. $(z - 4)(z - 6) = 0$

Solve each equation.

a. $(2x + 7)(2x - 7) = 0$

b. $(x - 1)^2 = 0$

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

Solve the equation. Check your solutions.

4. $(3s + 5)(5s + 8) = 0$

5. $(b + 7)^2 = 0$

6. $(d - 2)(d + 6)(d + 8) = 0$

Factor out the greatest common monomial factor from $4x^4 + 24x^3$.

7. Factor out the greatest common monomial factor from $8y^2 - 24y$.

Solve (a) $2x^2 + 8x = 0$ and (b) $6n^2 = 15n$.

Solve the equation. Check your solutions.

8. $a^2 + 5a = 0$

9. $3s^2 - 9s = 0$

10. $4x^2 = 2x$

You can model the arch of a fireplace using the equation

$y = -\frac{1}{9}(x + 18)(x - 18)$, where x and y are measured in inches.

The x -axis represents the floor. Find the width of the arch at floor level.

11. You can model the entrance to a mine shaft using the equation $y = -\frac{1}{2}(x + 4)(x - 4)$, where x and y are measured in feet. The x -axis represents the ground. Find the width of the entrance at ground level.

- **Exit Ticket:** Write a polynomial equation that has -6 and 4 as solutions.