

## Martin-Gay Interactive Videos



See Video 2.1

Watch the section lecture video and answer the following questions.

OBJECTIVE

1

9. Complete these statements based on the lecture given before Example 1. The addition property of equality allows us to add the same number to (or subtract the same number from) \_\_\_\_\_ of an equation and have an equivalent equation. The multiplication property of equality allows us to multiply (or divide) both sides of an equation by the \_\_\_\_\_ nonzero number and have an equivalent equation.

OBJECTIVE

2

10. From Example 2, if an equation is simplified by removing parentheses before the properties of equality are applied, what property is used?

OBJECTIVE

3

11. In Example 3, what is the main reason given for first removing fractions from the equation?

OBJECTIVE

4

12. Complete this statement based on Example 4. When solving a linear equation and all variable terms subtract out and:

- you have a \_\_\_\_\_ statement, then the equation has all real numbers for which the equation is defined as solutions.
- you have a \_\_\_\_\_ statement, then the equation has no solution.

## 2.1 Exercise Set MyMathLab®

Solve each equation and check. See Examples 1 and 2.

- $-5x = -30$
- $-2x = 18$
- $-10 = x + 12$
- $-25 = y + 30$
- $x - 2.8 = 1.9$
- $y - 8.6 = -6.3$
- $5x - 4 = 26 + 2x$
- $5y - 3 = 11 + 3y$
- $-4.1 - 7z = 3.6$
- $10.3 - 6x = -2.3$
- $5y + 12 = 2y - 3$
- $4x + 14 = 6x + 8$

Solve each equation and check. See Examples 3 and 4.

- $3x - 4 - 5x = x + 4 + x$
- $13x - 15x + 8 = 4x + 2 - 24$
- $8x - 5x + 3 = x - 7 + 10$
- $6 + 3x + x = -x + 8 - 26 + 24$
- $5x + 12 = 2(2x + 7)$
- $2(4x + 3) = 7x + 5$
- $3(x - 6) = 5x$
- $6x = 4(x - 5)$
- $-2(5y - 1) - y = -4(y - 3)$
- $-4(3n - 2) - n = -11(n - 1)$

Solve each equation and check. See Examples 5 through 7.

- $\frac{x}{2} + \frac{x}{3} = \frac{3}{4}$
- $\frac{x}{2} + \frac{x}{5} = \frac{5}{4}$
- $\frac{3t}{4} - \frac{t}{2} = 1$
- $\frac{4r}{5} - \frac{r}{10} = 7$
- $\frac{n-3}{4} + \frac{n+5}{7} = \frac{5}{14}$
- $\frac{2+h}{9} + \frac{h-1}{3} = \frac{1}{3}$
- $0.6x - 10 = 1.4x - 14$
- $0.3x + 2.4 = 0.1x + 4$

31.  $\frac{3x-1}{9} + x = \frac{3x+1}{3} + 4$

32.  $\frac{2z+7}{8} - 2 = z + \frac{z-1}{2}$

33.  $1.5(4-x) = 1.3(2-x)$

34.  $2.4(2x+3) = -0.1(2x+3)$

Solve each equation. See Examples 8 and 9.

- $4(n+3) = 2(6+2n)$
- $6(4n+4) = 8(3+3n)$
- $3(x+1) + 5 = 3x + 2$
- $4(x+2) + 4 = 4x - 8$
- $2(x-8) + x = 3(x-6) + 2$
- $5(x-4) + x = 6(x-2) - 8$
- $4(x+5) = 3(x-4) + x$
- $9(x-2) = 8(x-3) + x$

## MIXED PRACTICE

Solve each equation. See Examples 1 through 9.

- $\frac{3}{8} + \frac{b}{3} = \frac{5}{12}$
- $\frac{a}{2} + \frac{7}{4} = 5$
- $x - 10 = -6x - 10$
- $4x - 7 = 2x - 7$
- $5(x-2) + 2x = 7(x+4) - 38$
- $3x + 2(x+4) = 5(x+1) + 3$
- $y + 0.2 = 0.6(y+3)$
- $-(w+0.2) = 0.3(4-w)$
- $\frac{1}{4}(a+2) = \frac{1}{6}(5-a)$
- $\frac{1}{3}(8+2c) = \frac{1}{5}(3c-5)$
- $2y + 5(y-4) = 4y - 2(y-10)$

54.  $9c - 3(6 - 5c) = c - 2(3c + 9)$

55.  $6x - 2(x - 3) = 4(x + 1) + 4$

56.  $10x - 2(x + 4) = 8(x - 2) + 6$

57.  $\frac{m-4}{3} - \frac{3m-1}{5} = 1$       58.  $\frac{n+1}{8} - \frac{2-n}{3} = \frac{5}{6}$

59.  $8x - 12 - 3x = 9x - 7$

60.  $10y - 18 - 4y = 12y - 13$

61.  $-(3x - 5) - (2x - 6) + 1 = -5(x - 1) - (3x + 2) + 3$

62.  $-4(2x - 3) - (10x + 7) - 2 = -(12x - 5) - (4x + 9) - 1$

63.  $\frac{1}{3}(y + 4) + 6 = \frac{1}{4}(3y - 1) - 2$

64.  $\frac{1}{5}(2y - 1) - 2 = \frac{1}{2}(3y - 5) + 3$

65.  $2[7 - 5(1 - n)] + 8n = -16 + 3[6(n + 1) - 3n]$

66.  $3[8 - 4(n - 2)] + 5n = -20 + 2[5(1 - n) - 6n]$

REVIEW AND PREVIEW

**Translating.** Translate each phrase into an expression. Use the variable  $x$  to represent each unknown number. See Section 1.2.

67. The quotient of 8 and a number

68. The sum of 8 and a number

69. The product of 8 and a number

70. The difference of 8 and a number

71. Five subtracted from twice a number

72. Two more than three times a number

CONCEPT EXTENSIONS

Find the error for each proposed solution. Then correct the proposed solution. See the Concept Check in this section.

73.  ~~$2x + 19 = 13$   
 $2x = 32$   
 $2x = \frac{32}{2}$   
 $x = 16$~~

74.  ~~$-3(x - 4) = 10$   
 $-3x - 12 = 10$   
 $-3x = 22$   
 $\frac{-3x}{-3} = \frac{22}{-3}$   
 $x = -\frac{22}{3}$~~

75.  ~~$9x + 1.6 = 4x + 0.4$   
 $5x = 1.2$   
 $\frac{5x}{5} = \frac{1.2}{5}$   
 $x = 0.24$~~

76.  ~~$\frac{x}{3} + 7 = \frac{5x}{3}$   
 $x + 7 = 5x$   
 $7 = 4x$   
 $\frac{7}{4} = \frac{4x}{4}$   
 $\frac{7}{4} = x$~~

By inspection, decide which equations have no solution and which equations have all real numbers as solutions.

77.  $2x + 3 = 2x + 3$

78.  $5x - 3 = 5x - 3$

79.  $2x + 1 = 2x + 3$

80.  $5x - 2 = 5x - 7$

81. a. Simplify the expression  $4(x + 1) + 1$ .

b. Solve the equation  $4(x + 1) + 1 = -7$ .

c. Explain the difference between solving an equation for a variable and simplifying an expression.

82. Explain why the multiplication property of equality does not include multiplying both sides of an equation by 0. (Hint: Write down a false statement and then multiply both sides by 0. Is the result true or false? What does this mean?)

83. In your own words, explain why the equation  $x + 7 = x + 7$  has no solution, while the solution set of the equation  $x + 7 = x + 7$  contains all real numbers.

84. In your own words, explain why the equation  $x = -x$  has one solution—namely, 0—while the solution set of the equation  $x = x$  is all real numbers.

Find the value of  $K$  such that the equations are equivalent.

85.  $3.2x + 4 = 5.4x - 7$

$3.2x = 5.4x + K$

86.  $-7.6y - 10 = -1.1y + 12$

$-7.6y = -1.1y + K$

87.  $\frac{7}{11}x + 9 = \frac{3}{11}x - 14$

$\frac{7}{11}x = \frac{3}{11}x + K$

88.  $\frac{x}{6} + 4 = \frac{x}{3}$

$x + K = 2x$

89. Write a linear equation in  $x$  whose only solution is 5.

90. Write an equation in  $x$  that has no solution.

Solve the following.

91.  $x(x - 6) + 7 = x(x + 1)$

92.  $7x^2 + 2x - 3 = 6x(x + 4) + x^2$

93.  $3x(x + 5) - 12 = 3x^2 + 10x + 3$

94.  $x(x + 1) + 16 = x(x + 5)$

Solve and check.

95.  $2.569x = -12.48534$

96.  $-9.112y = -47.537304$

97.  $2.86z - 8.1258 = -3.75$

98.  $1.25x - 20.175 = -8.15$