2.2 The Multiplication Property of Equality

OBJECTIVES

1. Use the multiplication property of equality.
2. Simplify equations, and then use the multiplication property of equality.

Mult. Prop.

$$A \cdot C = B \cdot C$$

$$\frac{A}{C} = \frac{B}{C}$$

You may mult. or divide both sides of an eq. by the same nonzero number to produce an eq. equation.

$$\vdots$$

$$x = \#$$

By what number is it necessary to multiply both sides of each equation to get just x on the left side? Do not actually solve these equations.

7. $\frac{2}{3}x = 8$	**8.** $\frac{4}{5}x = 6$	**9.** $\frac{x}{10} = 3$	**10.** $\frac{x}{100} = 8$
11. $-\frac{9}{2}x = -4$	**12.** $-\frac{8}{3}x = -11$	**13.** $-x = .36$	**14.** $-x = .29$

7) $\frac{2}{3}x = 8$

$\frac{3}{2} \cdot \frac{2}{3}x = \frac{3}{2} \cdot \frac{8}{1}$ (4)

$x = 12$

9) $\frac{x}{10} = 3$

$\frac{10}{1} \cdot \frac{1}{10}x = 3 \cdot \frac{10}{1}$

$x = 30$

$\frac{x}{10} = 3$

$10\left(\frac{x}{10}\right) = 10(3)$

$x = 30$

$-x = .29$

$-1x = .29$

$-1(-1x) = -1(.29)$

$x = -.29$

By what number is it necessary to divide both sides of each equation to get just x on the left side? Do not actually solve these equations.

15. $6x = 5$	**16.** $7x = 10$	**17.** $-4x = 13$	**18.** $-13x = 6$
19. $.12x = 48$	**20.** $.21x = 63$	**21.** $-x = 23$	**22.** $-x = 49$

(15) $\frac{6x}{6} = \frac{5}{6}$

$x = \frac{5}{6}$

$6x - 6$

(17) $\frac{-4x}{-4} = \frac{13}{-4}$

$x = -\frac{13}{4}$

(21) $\frac{-1x}{-1} = \frac{23}{-1}$

$x = -23$

23. $5x = 30$	**24.** $7x = 56$	**25.** $2m = 15$	**26.** $3m = 10$
27. $3a = -15$	**28.** $5k = -70$	**29.** $-3x = 12$	**30.** $-4x = 36$
31. $10t = -36$	**32.** $4s = -34$	**33.** $-6x = -72$	**34.** $-8x = -64$
35. $2r = 0$	**36.** $5x = 0$	**37.** $.2t = 8$	**38.** $.9x = 18$
39. $-2.1m = 25.62$	**40.** $-3.9a = 31.2$	**41.** $\frac{1}{4}y = -12$	**42.** $\frac{1}{5}p = -3$
43. $\frac{z}{6} = 12$	**44.** $\frac{x}{5} = 15$	**45.** $\frac{x}{7} = -5$	**46.** $\frac{k}{8} = -3$
47. $\frac{2}{7}p = 4$	**48.** $\frac{3}{8}y = 9$	**49.** $-\frac{5}{6}t = -15$	**50.** $-\frac{3}{4}k = -21$
51. $-\frac{7}{9}c = \frac{3}{5}$	**52.** $-\frac{5}{6}d = \frac{4}{9}$	**53.** $-y = 12$	**54.** $-t = 14$
55. $-x = -\frac{3}{4}$	**56.** $-y = -\frac{1}{2}$		

$x = 8$

24) $\frac{7x}{7} = \frac{56}{7}$ $\quad x = 8$ $\quad \{8\}$ $\quad$ ck: $7(8) \stackrel{?}{=} 56$, $56 = 56$

25) $\frac{2m}{2} = \frac{15}{2}$ $\quad m = \frac{15}{2}$ $\quad \{\frac{15}{2}\}$

30) $\frac{-4x}{-4} = \frac{36}{-4}$ $\quad x = -9$ $\quad \{-9\}$

36) $\frac{5x}{5} = \frac{0}{5}$ $\quad x = 0$ $\quad \{0\}$

43) $\frac{z}{6} = 12$ $\quad 6\left(\frac{z}{6}\right) = 6(12)$ $\quad z = 72$

52) $-\frac{5}{6}d = \frac{4}{9}$ $\quad \frac{-5}{6}$ $\quad \frac{-5}{6}$ $\quad \rightarrow -\frac{6}{5}\left(-\frac{5}{6}d\right) = -\frac{6}{5}\left(\frac{4}{9}\right)$ $\quad d = -\frac{24}{45}$

mult. both sides by reciprocal

57. $4x + 3x = 21$	**58.** $9x + 2x = 121$	**59.** $3r - 5r = 10$
60. $9p - 13p = 24$	**61.** $5m + 6m - 2m = 63$	**62.** $11r - 5r + 6r = 168$
63. $-6x + 4x - 7x = 0$	**64.** $-5x + 4x - 8x = 0$	**65.** $9w - 5w + w = -3$
66. $10y - 6y + 3y = -4$		

57) $4x+3x=21$

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

$x=3$

$\{3\}$

60) $9p-13p=24$

$-4p=24$

$\frac{-4p}{-4}=\frac{24}{-4}$

$p=-6$ $\{-6\}$

Write an equation using the information given in the problem. Use x as the variable. Then solve the equation.

69. When a number is multiplied by 4, the result is 6. Find the number.

70. When a number is multiplied by −4, the result is 10. Find the number.

71. When a number is divided by −5, the result is 2. Find the number.

72. If twice a number is divided by 5, the result is 4. Find the number.

69) $\frac{4x}{4} = \frac{6}{4}$

$x = \frac{6}{4} = \frac{3}{2}$

The # is $\frac{3}{2}$.

71) $\frac{x}{-5} = 2$

$(-5)\left(\frac{x}{-5}\right) = (-5)(2)$

$x = -10$

The # is −10.

+/-

mult/div

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