

Answers to Unit 7

SECTION 1

Pages 243-246

Example 2

$$\frac{6x^5y}{12x^2y^3} = \frac{\overset{1}{2} \cdot \overset{1}{3} \cdot x^5y}{\overset{1}{2} \cdot \overset{1}{2} \cdot \overset{3}{3}x^2y^3} = \frac{x^3}{2y^2}$$

Example 6

$$\frac{x^2 + 4x - 12}{x^2 - 3x + 2} = \frac{(x-2)(x+6)}{(x-1)(x-2)} = \frac{x+6}{x-1}$$

Example 8

$$\frac{12x^2 + 3x}{10x - 15} \cdot \frac{8x - 12}{9x + 18} =$$

$$\frac{3x(4x + 1)}{5(2x - 3)} \cdot \frac{4(2x - 3)}{9(x + 3)} =$$

$$\frac{\overset{1}{3}x(4x + 1) \cdot \overset{1}{2} \cdot \overset{1}{2}(2x - 3)}{\overset{1}{5}(2x - 3) \cdot \overset{1}{3} \cdot \overset{1}{3}(x + 2)} = \frac{4x(4x + 1)}{15(x + 2)}$$

Example 12

$$\frac{a^2}{4bc^2 - 2b^2c} + \frac{a}{6bc - 3b^2} =$$

$$\frac{a^2}{4bc^2 - 2b^2c} \cdot \frac{6bc - 3b^2}{a} =$$

$$\frac{\overset{1}{a^2} \cdot \overset{1}{3b}(2c - b)}{\overset{1}{2bc}(2c - b)} \cdot a = \frac{3a}{2c}$$

Example 4

$$\frac{x^2 + 2x - 24}{16 - x^2} = \frac{(x-4)(x+6)}{(4-x)(4+x)} = -\frac{x+6}{x+4}$$

Example 10

$$\frac{x^2 + 2x - 15}{9 - x^2} \cdot \frac{x^2 - 3x - 18}{x^2 - 7x + 6} =$$

$$\frac{(x-3)(x+5)}{(3-x)(3+x)} \cdot \frac{(x+3)(x-6)}{(x-1)(x-6)} =$$

$$\frac{\overset{-1}{(x-3)}(x+5) \cdot \overset{1}{(x+3)}(x-6)}{\overset{1}{(3-x)}(3+x) \cdot \overset{1}{(x-1)}(x-6)} = -\frac{x+5}{x-1}$$

Example 14

$$\frac{3x^2 + 26x + 16}{3x^2 - 7x - 6} + \frac{2x^2 + 9x - 5}{x^2 + 2x - 15} =$$

$$\frac{3x^2 + 26x + 16}{3x^2 - 7x - 6} \cdot \frac{x^2 + 2x - 15}{2x^2 + 9x - 5} =$$

$$\frac{\overset{1}{(3x+2)}(x+8) \cdot \overset{1}{(x+5)}(x-3)}{\overset{1}{(3x+2)}(x-3) \cdot \overset{1}{(2x-1)}(x+5)} = \frac{x+8}{2x-1}$$

Pages 247-250

1. $\frac{3}{4x}$ 3. $\frac{1}{x+3}$ 5. -1 7. $\frac{2}{3y}$ 9. $\frac{-3}{4x}$ 11. $\frac{a}{b}$ 13. $-\frac{2}{x}$ 15. $\frac{y-2}{y-3}$ 17. $\frac{x+5}{x+4}$ 19. $\frac{x+4}{x-3}$ 21. $-\frac{x+2}{x+5}$
23. $\frac{2(x+2)}{x+3}$ 25. $\frac{2x-1}{2x+3}$ 27. $-\frac{x+7}{x+6}$ 29. $\frac{5ab^2}{12x^2y}$ 31. $\frac{4x^3y^3}{3a^2}$ 33. $\frac{3}{4}$ 35. ab^2 37. $\frac{x^2(x-1)}{y(x+3)}$ 39. $\frac{y(x-1)}{x^2(x+10)}$
41. $-ab^2$ 43. $\frac{x+5}{x+4}$ 45. 1 47. $-\frac{n-10}{n-7}$ 49. $\frac{x(x+2)}{2(x-1)}$ 51. $-\frac{x+2}{x-6}$ 53. $\frac{x+5}{x-12}$ 55. $\frac{3y+2}{3y+1}$ 57. $-\frac{3x-5}{4x-5}$
59. $\frac{7a^3y^2}{40bx}$ 61. $\frac{4}{3}$ 63. $\frac{3a}{2}$ 65. $\frac{x^2(x+4)}{y^2(x+2)}$ 67. $\frac{x(x-2)}{y(x-6)}$ 69. $-\frac{3by}{ax}$ 71. $\frac{(x-3)(x+6)}{(x+7)(x-6)}$ 73. 1 75. $-\frac{x+8}{x-4}$
77. $\frac{2n+1}{2n-3}$ 79. $-\frac{3x+1}{2x-3}$ 81. $\frac{(3x+2)(5-4x)(5x-4)}{(2x-3)(4x+5)(3x-5)}$

SECTION 2

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Example 2

$$8uv^2 = 2 \cdot 2 \cdot 2 \cdot u \cdot v \cdot v \quad 12uw = 2 \cdot 2 \cdot 3 \cdot u \cdot w$$

$$\text{LCM} = 2 \cdot 2 \cdot 2 \cdot 3 \cdot u \cdot v \cdot v \cdot w = 24uv^2w$$

Example 6The LCM is $36xy^2z$.

$$\frac{x-3}{4xy^2} = \frac{x-3}{4xy^2} \cdot \frac{9z}{9z} = \frac{9xz-27z}{36xy^2z}$$

$$\frac{2x+1}{9y^2z} = \frac{2x+1}{9y^2z} \cdot \frac{4x}{4x} = \frac{8x^2+4x}{36xy^2z}$$

Example 4

$$m^2 - 6m + 9 = (m-3)(m-3)$$

$$m^2 - 2m - 3 = (m+1)(m-3)$$

$$\text{LCM} = (m-3)(m-3)(m+1)$$

Example 8The LCM is $(x-5)(x+5)(x-2)$.

$$\frac{2x}{25-x^2} = \frac{2x}{-(x^2-25)} = -\frac{2x}{x^2-25}$$

$$\frac{x+4}{x^2-3x-10} = \frac{x+4}{(x+2)(x-5)} \cdot \frac{x+5}{x+5} =$$

$$\frac{x^2+9x+20}{(x+2)(x-5)(x+5)}$$

$$\frac{2x}{25-x^2} = -\frac{2x}{(x-5)(x+5)} \cdot \frac{x+2}{x+2} =$$

$$-\frac{2x^2+4x}{(x+2)(x-5)(x+5)}$$

Pages 253–254

1. $24x^3y^2$ 3. $30x^4y^2$ 5. $8x^2(x+2)$ 7. $6x^2y(x+4)$ 9. $36x(x+2)^2$ 11. $6(x+1)^2$
 13. $(x-1)(x+2)(x+3)$ 15. $(x-5)(2x+3)^2$ 17. $(x-1)(x-2)$ 19. $(x-3)(x+2)(x+4)$
 21. $(x+4)(x+1)(x-7)$ 23. $(x-6)(x+6)(x+4)$ 25. $(x+3)(x-8)(x-10)$
 27. $(x+2)(x-3)(3x-2)$ 29. $(x+2)(x-3)$ 31. $(x-5)(x+1)$ 33. $(x-1)(x-2)(x-3)(x-6)$
 35. $\frac{5}{ab^2}, \frac{6b}{ab^2}$ 37. $\frac{15y^2}{18x^2y}, \frac{14x}{18x^2y}$ 39. $\frac{ay+5a}{y^2(y+5)}, \frac{6y}{y^2(y+5)}$ 41. $\frac{a^2y+7a^2}{y(y+7)^2}, \frac{ay}{y(y+7)^2}$ 43. $\frac{b}{y(y-4)}, -\frac{b^2y}{y(y-4)}$
 45. $-\frac{3y-21}{(y-7)^2}, \frac{2}{(y-7)^2}$ 47. $\frac{2y^2}{y^2(y-3)}, \frac{3}{y^2(y-3)}$ 49. $\frac{x^3+4x^2}{(2x-1)(x+4)}, \frac{2x^2+x-1}{(2x-1)(x+4)}$
 51. $\frac{3x^2+15x}{(x-5)(x+5)}, \frac{4}{(x-5)(x+5)}$ 53. $\frac{x-3}{(3x-2)(x+2)}, \frac{6x-4}{(3x-2)(x+2)}$ 55. $\frac{x^2-1}{(x+5)(x-3)(x+1)}, \frac{x^2-3x}{(x+5)(x-3)(x+1)}$
 57. $-\frac{2x^2-6x}{(x-3)(x-5)(x+2)}, \frac{x^2+4x+4}{(x-3)(x-5)(x+2)}$ 59. $\frac{x^2-6x-7}{(x+5)(x-7)}, \frac{x^2+7x+10}{(x+5)(x-7)}, \frac{-3}{(x+5)(x-7)}$

SECTION 3

Pages 255–258

Example 2

$$\frac{3}{xy} + \frac{12}{xy} = \frac{3+12}{xy} = \frac{15}{xy}$$

Example 6

$$\frac{x^2-1}{x^2-8x+12} - \frac{2x+1}{x^2-8x+12} + \frac{x}{x^2-8x+12} =$$

$$\frac{(x^2-1) - (2x+1) + x}{x^2-8x+12} = \frac{x^2-1-2x-1+x}{x^2-8x+12} =$$

$$\frac{x^2-x-2}{x^2-8x+12} = \frac{(x+1)(x-2)}{(x-2)(x-6)} = \frac{x+1}{x-6}$$

Example 4

$$\frac{2x^2}{x^2-x-12} - \frac{7x+4}{x^2-x-12} = \frac{2x^2-(7x+4)}{x^2-x-12} =$$

$$\frac{2x^2-7x-4}{x^2-x-12} = \frac{(2x+1)(x-4)}{(x+3)(x-4)} = \frac{2x+1}{x+3}$$

Example 8The LCM of the denominators is $24y$.

$$\frac{z}{8y} = \frac{z}{8y} \cdot \frac{3}{3} = \frac{3z}{24y} \quad \frac{4z}{3y} = \frac{4z}{3y} \cdot \frac{8}{8} = \frac{32z}{24y}$$

$$\frac{5z}{4y} = \frac{5z}{4y} \cdot \frac{6}{6} = \frac{30z}{24y}$$

$$\frac{z}{8y} - \frac{4z}{3y} + \frac{5z}{4y} = \frac{3z}{24y} - \frac{32z}{24y} + \frac{30z}{24y} =$$

$$\frac{3z-32z+30z}{24y} = \frac{z}{24y}$$

Example 10

 The LCM is $x - 2$.

$$\frac{5x}{x-2} = \frac{5x}{x-2} \cdot \frac{1}{1} = \frac{5x}{x-2}$$

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

$$\frac{5x}{x-2} - \frac{3}{2-x} = \frac{5x}{x-2} - \frac{-3}{x-2} =$$

$$\frac{5x - (-3)}{x-2} = \frac{5x+3}{x-2}$$

Example 14

 The LCM is $(x+5)(x-5)$.

$$\frac{2x-1}{x^2-25} = \frac{2x-1}{(x+5)(x-5)}$$

$$\frac{2}{5-x} = \frac{2}{-(x-5)} \cdot \frac{-1 \cdot (x+5)}{-1 \cdot (x+5)} = \frac{-2(x+5)}{(x+5)(x-5)}$$

$$\frac{2x-1}{x^2-25} + \frac{2}{5-x} =$$

$$\frac{2x-1}{(x+5)(x-5)} + \frac{-2(x+5)}{(x+5)(x-5)} =$$

$$\frac{2x-1 + (-2)(x+5)}{(x+5)(x-5)} = \frac{2x-1-2x-10}{(x+5)(x-5)} =$$

$$\frac{-11}{(x+5)(x-5)} = -\frac{11}{(x+5)(x-5)}$$

Example 12

 The LCM is $(3x-1)(x+4)$.

$$\frac{4x}{3x-1} = \frac{4x}{3x-1} \cdot \frac{x+4}{x+4} = \frac{4x^2+16x}{(3x-1)(x+4)}$$

$$\frac{9}{x+4} = \frac{9}{x+4} \cdot \frac{3x-1}{3x-1} = \frac{27x-9}{(3x-1)(x+4)}$$

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

$$\frac{4x^2+16x}{(3x-1)(x+4)} - \frac{27x-9}{(3x-1)(x+4)} =$$

$$\frac{4x^2+16x-(27x-9)}{(3x-1)(x+4)} = \frac{4x^2+16x-27x+9}{(3x-1)(x+4)} =$$

$$\frac{4x^2-11x+9}{(3x-1)(x+4)}$$

Example 16

 The LCM is $(3x+2)(x-1)$.

$$\frac{2x-3}{3x^2-x-2} = \frac{2x-3}{(3x+2)(x-1)}$$

$$\frac{5}{3x+2} = \frac{5}{3x+2} \cdot \frac{x-1}{x-1} = \frac{5x-5}{(3x+2)(x-1)}$$

$$\frac{1}{x-1} = \frac{1}{x-1} \cdot \frac{3x+2}{3x+2} = \frac{3x+2}{(3x+2)(x-1)}$$

$$\frac{2x-3}{3x^2-x-2} + \frac{5}{3x+2} - \frac{1}{x-1} =$$

$$\frac{2x-3}{(3x+2)(x-1)} + \frac{5x-5}{(3x+2)(x-1)} - \frac{3x+2}{(3x+2)(x-1)} =$$

$$\frac{(2x-3) + (5x-5) - (3x+2)}{(3x+2)(x-1)} =$$

$$\frac{2x-3+5x-5-3x-2}{(3x+2)(x-1)} =$$

$$\frac{4x-10}{(3x+2)(x-1)} = \frac{2(2x-5)}{(3x+2)(x-1)}$$

Pages 259–262

1. $\frac{11}{y^2}$ 3. $-\frac{7}{x+4}$ 5. $\frac{8x}{2x+3}$ 7. $\frac{5x+7}{x-3}$ 9. $\frac{2x-5}{x+9}$ 11. $\frac{-3x-4}{2x+7}$ 13. $\frac{1}{x+5}$ 15. $\frac{1}{x-6}$ 17. $\frac{3}{2y-1}$
 19. $\frac{1}{x-5}$ 21. $\frac{4y+5x}{xy}$ 23. $\frac{19}{2x}$ 25. $\frac{5}{12x}$ 27. $\frac{19x-12}{6x^2}$ 29. $\frac{52y-35x}{20xy}$ 31. $\frac{13x+2}{15x}$ 33. $\frac{7}{24}$
 35. $\frac{x+90}{45x}$ 37. $\frac{x^2+2x+2}{2x^2}$ 39. $\frac{2x^2+3x-10}{4x^2}$ 41. $\frac{-3x^2+16x+2}{12x^2}$ 43. $\frac{x^2-x-2}{x^2y}$
 45. $\frac{16xy-12y+6x^2+3x}{12x^2y^2}$ 47. $\frac{3xy-6y-2x^2-14x}{24x^2y}$ 49. $\frac{9x+2}{(x-2)(x+3)}$ 51. $\frac{2(x+23)}{(x-7)(x+3)}$
 53. $\frac{2x^2-5x+1}{(x+1)(x-3)}$ 55. $\frac{4x^2-34x+5}{(2x-1)(x-6)}$ 57. $\frac{2a-5}{a-7}$ 59. $\frac{4x+9}{(x-3)(x+3)}$ 61. $\frac{-x+9}{(x+2)(x-3)}$ 63. $\frac{14}{(x-5)(x-5)}$
 65. $\frac{-2(x+7)}{(x+6)(x-7)}$ 67. $\frac{x-4}{x-6}$ 69. $\frac{2x+1}{x-1}$ 71. $\frac{-3(x^2+8x+25)}{(x-3)(x+7)}$

SECTION 4

Pages 263–264

Example 2The LCM of 3, x , 9, and x^2 is $9x^2$.

$$\frac{\frac{1}{3} - \frac{1}{x}}{\frac{1}{9} - \frac{1}{x^2}} = \frac{\frac{1}{3} - \frac{1}{x}}{\frac{1}{9} - \frac{1}{x^2}} \cdot \frac{9x^2}{9x^2} = \frac{\frac{1}{3} \cdot 9x^2 - \frac{1}{x} \cdot 9x^2}{\frac{1}{9} \cdot 9x^2 - \frac{1}{x^2} \cdot 9x^2} =$$

$$\frac{3x^2 - 9x}{x^2 - 9} = \frac{3x(x-3)}{(x-3)(x+3)} = \frac{3x}{x+3}$$

Example 4The LCM of x and x^2 is x^2 .

$$\frac{1 + \frac{4}{x} + \frac{3}{x^2}}{1 + \frac{10}{x} + \frac{21}{x^2}} = \frac{1 + \frac{4}{x} + \frac{3}{x^2}}{1 + \frac{10}{x} + \frac{21}{x^2}} \cdot \frac{x^2}{x^2} =$$

$$\frac{1 \cdot x^2 + \frac{4}{x} \cdot x^2 + \frac{3}{x^2} \cdot x^2}{1 \cdot x^2 + \frac{10}{x} \cdot x^2 + \frac{21}{x^2} \cdot x^2} = \frac{x^2 + 4x + 3}{x^2 + 10x + 21} =$$

$$\frac{(x+1)(x+3)}{(x+3)(x+7)} = \frac{x+1}{x+7}$$

Example 6The LCM is $x - 5$.

$$\frac{x+3 - \frac{20}{x-5}}{x+8 + \frac{30}{x-5}} = \frac{x+3 - \frac{20}{x-5}}{x+8 + \frac{30}{x-5}} \cdot \frac{x-5}{x-5} =$$

$$\frac{(x+3)(x-5) - \frac{20}{x-5} \cdot (x-5)}{(x+8)(x-5) + \frac{30}{x-5} \cdot (x-5)} =$$

$$\frac{x^2 - 2x - 15 - 20}{x^2 + 3x - 40 + 30} = \frac{x^2 - 2x - 35}{x^2 + 3x - 10} =$$

$$\frac{(x-7)(x+5)}{(x-2)(x+5)} = \frac{x-7}{x-2}$$

Pages 265–266

1. $\frac{x}{x-3}$ 3. $\frac{2}{3}$ 5. $\frac{y+3}{y-4}$ 7. $\frac{2(2x+13)}{5x+36}$ 9. $\frac{x+2}{x+3}$ 11. $\frac{x-6}{x+5}$ 13. $-\frac{x-2}{x+1}$ 15. $x-1$ 17. $\frac{1}{2x-1}$
19. $\frac{x-3}{x+5}$ 21. $\frac{x-7}{x-8}$ 23. $\frac{2y-1}{2y+1}$ 25. $\frac{x-2}{2x-5}$ 27. $-\frac{x+1}{4x-3}$ 29. $\frac{x+1}{2(5x-2)}$ 31. $\frac{b+11}{4b-21}$

SECTION 5

Pages 267–268

Example 2

$$\frac{x}{x+6} = \frac{3}{x} \quad \text{The LCM is } x(x+6).$$

$$\frac{x(x+6)}{1} \cdot \frac{x}{x+6} = \frac{x(x+6)}{1} \cdot \frac{3}{x}$$

$$x^2 = (x+6)3$$

$$x^2 = 3x + 18$$

$$x^2 - 3x - 18 = 0$$

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

$$x+3 = 0$$

$$x-6 = 0$$

$$x = -3$$

$$x = 6$$

Both -3 and 6 check as solutions.The solutions are -3 and 6 .**Example 4**

$$\frac{5x}{x+2} = 3 - \frac{10}{x+2} \quad \text{The LCM is } x+2.$$

$$\frac{(x+2)}{1} \cdot \frac{5x}{x+2} = \frac{(x+2)}{1} \left(3 - \frac{10}{x+2} \right)$$

$$\frac{x+2}{1} \cdot \frac{5x}{x+2} = \frac{x+2}{1} \cdot 3 - \frac{x+2}{1} \cdot \frac{10}{x+2}$$

$$5x = (x+2)3 - 10$$

$$5x = 3x + 6 - 10$$

$$5x = 3x - 4$$

$$2x = -4$$

$$x = -2$$

 -2 does not check as a solution.

The equation has no solution.

Pages 269–270

1. The solution is 3. 3. The solution is 1. 5. The solution is 9. 7. The solution is 1. 9. The solution is $\frac{1}{4}$.
 11. The solution is 1. 13. The solution is -3 . 15. The solution is $\frac{1}{2}$. 17. The solution is 8. 19. The solution is 5.
 21. The solution is -1 . 23. The solution is 5. 25. The equation has no solution. 27. The solutions are 2 and 4.
 29. The solutions are $-\frac{3}{2}$ and 4. 31. The solution is 3. 33. The solution is 4. 35. The solution is -1 .

SECTION 6

Pages 271–272

Example 2

$$\begin{aligned} \frac{2}{x+3} &= \frac{6}{5x+5} \\ \frac{(x+3)(5x+5)}{1} \cdot \frac{2}{x+3} &= \frac{(x+3)(5x+5)}{1} \cdot \frac{6}{5x+5} \\ \frac{1}{(x+3)(5x+5)} \cdot \frac{2}{x+3} &= \frac{1}{(x+3)(5x+5)} \cdot \frac{6}{5x+5} \\ (5x+5)2 &= (x+3)6 \\ 10x+10 &= 6x+18 \\ 4x+10 &= 18 \\ 4x &= 8 \\ x &= 2 \end{aligned}$$

The solution is 2.

Example 4

Strategy

To find the total area that 256 ceramic tiles will cover, write and solve a proportion using x to represent the number of square feet that 256 tiles will cover.

Solution

$$\begin{aligned} \frac{9}{16} &= \frac{x}{256} \\ 256\left(\frac{9}{16}\right) &= 256\left(\frac{x}{256}\right) \\ 144 &= x \end{aligned}$$

A 144-square-foot area can be tiled using 256 ceramic tiles.

Example 6

Strategy

To find the additional amount of medication required for a 200-pound adult, write and solve a proportion using x to represent the additional medication. Then $3+x$ is the total amount required for a 200-pound adult.

Solution

$$\begin{aligned} \frac{150}{3} &= \frac{200}{3+x} \\ \frac{50}{1} &= \frac{200}{3+x} \\ (3+x) \cdot 50 &= (3+x) \cdot \frac{200}{3+x} \\ (3+x) \cdot 50 &= 200 \\ 150 + 50x &= 200 \\ 50x &= 50 \\ x &= 1 \end{aligned}$$

One additional ounce is required for a 200-pound adult.

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1. The solution is 9. 3. The solution is 12. 5. The solution is 7. 7. The solution is 6. 9. The solution is 1.
 11. The solution is -6 . 13. The solution is 4. 15. The solution is $-\frac{2}{3}$.

Pages 273–274

1. 10 lb of salt are required for 25 gal of water. 3. 10,000 people are expected to vote. 5. 150 ft² of decking can be made from 36 pieces of lumber. 7. The license fee is \$90. 9. There are 240 deer in the preserve. 11. To earn a dividend of \$186, 50 additional shares are needed. 13. $1\frac{1}{2}$ additional gal of fruit punch are necessary.

SECTION 7

Pages 275–276

Example 2

$$\begin{aligned} 5x - 2y &= 10 \\ 5x + (-5x) - 2y &= (-5x) + 10 \\ -2y &= -5x + 10 \\ -\frac{1}{2}(-2y) &= -\frac{1}{2}(-5x + 10) \\ y &= \frac{5}{2}x - 5 \end{aligned}$$

Example 6

$$\begin{aligned} S &= a + (n - 1)d \\ S &= a + nd - d \\ S + (-a) &= a + (-a) + nd - d \\ S - a &= nd - d \\ S - a + d &= nd - d + d \\ S - a + d &= nd \\ \frac{1}{d}(S - a + d) &= \frac{1}{d}(nd) \\ \frac{S - a + d}{d} &= n \end{aligned}$$

Example 4

$$\begin{aligned} s &= \frac{A + L}{2} \\ 2 \cdot s &= 2\left(\frac{A + L}{2}\right) \\ 2s &= A + L \\ 2s + (-A) &= A + (-A) + L \\ 2s - A &= L \end{aligned}$$

Example 8

$$\begin{aligned} S &= C + rC \\ S &= (1 + r)C \\ \frac{1}{1+r} \cdot S &= \frac{1}{1+r}(1+r)C \\ \frac{S}{1+r} &= C \end{aligned}$$

Pages 277–278

1. $y = -3x + 10$ 3. $y = 4x - 3$ 5. $y = -\frac{3}{2}x + 3$ 7. $y = \frac{2}{5}x - 2$ 9. $y = -\frac{2}{7}x + 2$
 11. $y = -\frac{1}{3}x + 2$ 13. $y = \frac{1}{4}x - 3$ 15. $y = \frac{7}{2}x - 7$ 17. $y = 3x + 7$ 19. $x = -3y + 6$
 21. $x = \frac{1}{3}y + 1$ 23. $x = -\frac{5}{2}y + 5$ 25. $x = 2y - 1$ 27. $x = -\frac{4}{5}y - 4$ 29. $x = \frac{2}{3}y + 5$ 31. $h = \frac{2A}{b}$
 33. $t = \frac{d}{r}$ 35. $T = \frac{PV}{nR}$ 37. $l = \frac{P - 2w}{2}$ 39. $b_1 = \frac{2A - hb_2}{h}$ 41. $h = \frac{3V}{A}$ 43. $S = C - Rt$ 45. $P = \frac{A}{1 + rt}$
 47. $W = \frac{A}{S + 1}$

SECTION 8

Pages 279–282

Example 2

Strategy

▷ Time for one printer to complete the job: t

	Rate	Time	Part
1st printer	$\frac{1}{t}$	2	$\frac{2}{t}$
2nd printer	$\frac{1}{t}$	5	$\frac{5}{t}$

▷ The sum of the parts of the task completed must equal 1.

Solution

$$\frac{2}{t} + \frac{5}{t} = 1$$

$$t\left(\frac{2}{t} + \frac{5}{t}\right) = t \cdot 1$$

$$2 + 5 = t$$

$$7 = t$$

Working alone, one printer takes 7 h to print the payroll.

Example 4

Strategy

▷ Rate sailing across the lake: r

Rate sailing back: $3r$

	Distance	Rate	Time
Across	6	r	$\frac{6}{r}$
Back	6	$3r$	$\frac{6}{3r}$

▷ The total time for the trip was 2 h.

Solution

$$\frac{6}{r} + \frac{6}{3r} = 2$$

$$3r\left(\frac{6}{r} + \frac{6}{3r}\right) = 3r(2)$$

$$3r \cdot \frac{6}{r} + 3r \cdot \frac{6}{3r} = 6r$$

$$18 + 6 = 6r$$

$$24 = 6r$$

$$4 = r$$

The rate across the lake was 4 km/h.

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1. It will take 2 h to fill the fountain with both sprinklers operating. 3. With both members working together, it would take 12 min to mow the lawn. 5. It will take 30 min to print the report with both computers operating. 7. It would take the new machine 12 h to complete the task. 9. The assistant working alone would take 90 min. 11. It would take the cold water faucet 10 min to fill the tub. 13. It would take the apprentice 3 h to complete the installation. 15. It would take the second welder 2 h to complete the welds. 17. Working alone the smaller pipe would take $14\frac{2}{3}$ h to fill the pool. 19. Working alone the small compressor would take 12 h to cool the storage locker. 21. The freight train travels at 30 mph and the express train travels at 50 mph. 23. The rate of the twin-engine plane is 200 mph. 25. The rate of the prop plane was 150 mph and the rate of the jet was 600 mph. 27. The rate of the plane was 210 mph. 29. The rate of the freight train was 30 mph, and the rate of the passenger train was 60 mph. 31. The rate of the wind is 20 mph. 33. The rate of the wind is 20 mph. 35. The rate of the balloon on the first leg of the trip was 5 mph. 37. The rate of the current is 3 mph. 39. The rate of the plane for the first 200 mi was 100 mph.

REVIEW/TESTS

Pages 287–288

- 1.1a $\frac{2x^3}{3y^3}$ 1.1b $-\frac{x+5}{x+1}$ 1.2 $\frac{x+1}{x^3(x-2)}$ 1.3 $\frac{x+5}{x+4}$ 2.1 $3(2x-1)(x+1)$ 2.2 $\frac{3x+6}{x(x-2)(x+2)}, \frac{x^2}{x(x-2)(x+2)}$
 3.1 $\frac{2}{x+5}$ 3.2 $\frac{5}{(2x-1)(3x+1)}$ 4.1 $\frac{x-3}{x-2}$ 5.1a The solution is 2. 5.1b No solution 6.1 The solution is -1. 6.2 An additional 2 lb of salt are required. 7.1a $y = \frac{3}{8}x - 2$ 7.1b $t = \frac{d-s}{r}$ 8.1 It would take 4 h to fill the pool with both pipes turned on. 8.2 The rate of the wind is 20 mph.

Pages 289–290

- 1.1a d 1.1b c 1.2 c 1.3 a 2.1 b 2.2 a 3.1 c 3.2 c 4.1 d 5.1a c 5.1b b 6.1 a
 6.2 c 7.1a c 7.1b a 8.1 d 8.2 c