In Exercises 31 and 32, complete the table. What can you conclude?

31.

x	0	1	2	3	4	5	6
$\dfrac{x^2 - 2x - 3}{x - 3}$							
$x + 1$							

32.

x	0	1	2	3	4	5	6
$\dfrac{x - 3}{x^2 - x - 6}$							
$\dfrac{1}{x + 2}$							

33. ***Error Analysis*** Describe the error.

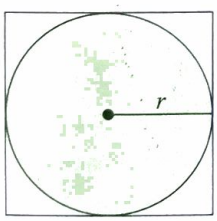
$$\frac{5x^3}{2x^3 + 4} = \frac{5x^3}{2x^3 + 4} = \frac{5}{2 + 4} = \frac{5}{6}$$

34. ***Think About It*** Is the following statement true for all nonzero real numbers a and b? Explain.

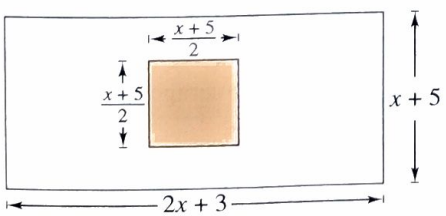
$$\frac{ax - b}{b - ax} = -1$$

In Exercises 35 and 36, find the ratio of the area of the shaded portion of the figure to the total area of the figure.

35.



36.



In Exercises 37–50, perform the multiplication or division and simplify.

37. $\dfrac{5}{x - 1} \cdot \dfrac{x - 1}{25(x - 2)}$

38. $\dfrac{x + 13}{x^3(3 - x)} \cdot \dfrac{x(x - 3)}{5}$

39. $\dfrac{(x + 5)(x - 3)}{x + 2} \cdot \dfrac{1}{(x + 5)(x + 2)}$

40. $\dfrac{(x - 9)(x + 7)}{x + 1} \cdot \dfrac{x}{9 - x}$

41. $\dfrac{r}{r - 1} \cdot \dfrac{r^2 - 1}{r^2}$

42. $\dfrac{4y - 16}{5y + 15} \cdot \dfrac{2y + 6}{4 - y}$

43. $\dfrac{t^2 - t - 6}{t^2 + 6t + 9} \cdot \dfrac{t + 3}{t^2 - 4}$

44. $\dfrac{y^3 - 8}{2y^3} \cdot \dfrac{4y}{y^2 - 5y + 6}$

45. $\dfrac{x^2 + xy - 2y^2}{x^3 + x^2y} \cdot \dfrac{x}{x^2 + 3xy + 2y^2}$

46. $\dfrac{x^3 - 1}{x + 1} \cdot \dfrac{x^2 + 1}{x^2 - 1}$

47. $\dfrac{3(x + y)}{4} \div \dfrac{x + y}{2}$

48. $\dfrac{x + 2}{5(x - 3)} \div \dfrac{x - 2}{5(x - 3)}$

49. $\dfrac{\left[\dfrac{x^2}{(x + 1)^2}\right]}{\left[\dfrac{x}{(x + 1)^3}\right]}$

50. $\dfrac{\left(\dfrac{x^2 - 1}{x}\right)}{\left[\dfrac{(x - 1)^2}{x}\right]}$

In Exercises 51–64, perform the addition or subtraction and simplify.

51. $\dfrac{5}{x - 1} + \dfrac{x}{x - 1}$

52. $\dfrac{2x - 1}{x + 3} + \dfrac{1 - x}{x + 3}$

53. $6 - \dfrac{5}{x + 3}$

54. $\dfrac{3}{x - 1} - 5$

55. $\dfrac{3}{x - 2} + \dfrac{5}{2 - x}$

56. $\dfrac{2x}{x - 5} - \dfrac{5}{5 - x}$

57. $\dfrac{2}{x^2 - 4} - \dfrac{1}{x^2 - 3x + 2}$

58. $\dfrac{x}{x^2 + x - 2} - \dfrac{1}{x + 2}$

59. $\dfrac{1}{x^2 - x - 2} - \dfrac{x}{x^2 - 5x + 6}$

60. $\dfrac{2}{x^2 - x - 2} + \dfrac{10}{x^2 + 2x - 8}$

61. $-\dfrac{1}{x} + \dfrac{2}{x^2 + 1} + \dfrac{1}{x^3 + x}$

62. $\dfrac{2}{x + 1} + \dfrac{2}{x - 1} + \dfrac{1}{x^2 - 1}$

63. $x^2(x^2 + 1)^{-5} - (x^2 + 1)^{-4}$

64. $2x(x - 5)^{-3} - 4x^2(x - 5)^{-4}$

Error Analysis **In Exercises 65 and 66, describe the error.**

65.
$$\frac{x + 4}{x + 2} - \frac{3x - 8}{x + 2} = \frac{x + 4 - 3x - 8}{x + 2}$$
$$= \frac{-2x - 4}{x + 2}$$
$$= \frac{-2(x + 2)}{x + 2} = -2$$

66.
$$\frac{6 - x}{x(x + 2)} + \frac{x + 2}{x^2} + \frac{8}{x^2(x + 2)}$$
$$= \frac{x(6 - x) + (x + 2)^2 + 8}{x^2(x + 2)}$$
$$= \frac{6x - x^2 + x^2 + 4 + 8}{x^2(x + 2)}$$
$$= \frac{6(x + 2)}{x^2(x + 2)} = \frac{6}{x^2}$$

In Exercises 67–80, simplify the compound fraction.

67. $\dfrac{\left(\dfrac{x}{2} - 1\right)}{(x - 2)}$

68. $\dfrac{(x - 4)}{\left(\dfrac{x}{4} - \dfrac{4}{x}\right)}$

69. $\dfrac{\left(\dfrac{1}{x} - \dfrac{1}{x + 1}\right)}{\left(\dfrac{1}{x + 1}\right)}$

70. $\dfrac{\left(\dfrac{5}{y} - \dfrac{6}{2y + 1}\right)}{\left(\dfrac{5}{y} + 4\right)}$

71. $\dfrac{\left(\dfrac{x + 3}{x - 3}\right)^2}{\dfrac{1}{x + 3} + \dfrac{1}{x - 3}}$

72. $\dfrac{\left(\dfrac{x + 4}{x + 5} - \dfrac{x}{x + 1}\right)}{4}$

73. $\dfrac{\left[\dfrac{1}{(x + h)^2} - \dfrac{1}{x^2}\right]}{h}$

74. $\dfrac{\left(\dfrac{x + h}{x + h + 1} - \dfrac{x}{x + 1}\right)}{h}$

75. $\dfrac{\left(\sqrt{x} - \dfrac{1}{2\sqrt{x}}\right)}{\sqrt{x}}$

76. $\dfrac{3x^{1/3} - x^{-2/3}}{3x^{-2/3}}$

77. $\dfrac{\left(\dfrac{t^2}{\sqrt{t^2 + 1}} - \sqrt{t^2 + 1}\right)}{t^2}$

78. $\dfrac{-x^3(1 - x^2)^{-1/2} - 2x(1 - x^2)^{1/2}}{x^4}$

79. $\dfrac{x(x + 1)^{-3/4} - (x + 1)^{1/4}}{x^2}$

80. $\dfrac{(2x + 1)^{1/3} - \dfrac{4x}{3(2x + 1)^{2/3}}}{(2x + 1)^{2/3}}$

In Exercises 81 and 82, rationalize the numerator of the expression.

81. $\dfrac{\sqrt{x + 2} - \sqrt{x}}{2}$

82. $\dfrac{\sqrt{z - 3} - \sqrt{z}}{3}$

83. ***Rate*** A photocopier copies at a rate of 16 pages per minute.

(a) Find the time required to copy one page.

(b) Find the time required to copy x pages.

(c) Find the time required to copy 60 pages.

84. ***Rate*** After working together for t hours on a common task, two workers have done fractional parts of the job equal to $t/3$ and $t/5$, respectively. What fractional part of the task has been completed?

85. ***Average*** Determine the average of the two real numbers $x/3$ and $2x/5$.

86. ***Partition into Equal Parts*** Find three real numbers that divide the real number line between $x/3$ and $3x/4$ into four equal parts.