

$$\begin{aligned}
 & \frac{9}{18} \cdot \frac{7}{2} = \frac{2}{1} \cdot \frac{1}{9}x + \frac{2}{1} \cdot \frac{26}{9} && \text{Divide out common factors in the multiplications.} \\
 & 63 = 2x + 52 && \text{Complete the multiplications. The fractions are now cleared.} \\
 & 63 - 52 = 2x + 52 - 52 && \text{Subtract 52 from both sides to get constants on the left.} \\
 & 11 = 2x && \text{Simplify.} \\
 & \frac{11}{2} = \frac{2x}{2} && \text{Divide both sides by 2.} \\
 & \frac{11}{2} = x && \text{Simplify.}
 \end{aligned}$$

The formula indicates that if the high-humor group averages a level of depression of 3.5 in response to a negative life event, the intensity of that event is $\frac{11}{2}$, or 5.5. This is illustrated on the line graph for the high-humor group in **Figure 1.14**.

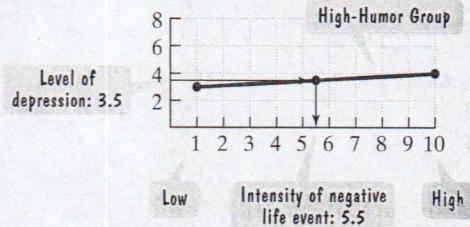


Figure 1.14

Check Point 8 Use the model for the low-humor group given in Example 8 to solve this problem. If the low-humor group averages a level of depression of 10 in response to a negative life event, what is the intensity of that event? How is the solution shown on the blue line graph in **Figure 1.13**?

Exercise Set 1.2

Practice Exercises

In Exercises 1–16, solve and check each linear equation.

1. $7x - 5 = 72$
2. $6x - 3 = 63$
3. $11x - (6x - 5) = 40$
4. $5x - (2x - 10) = 35$
5. $2x - 7 = 6 + x$
6. $3x + 5 = 2x + 13$
7. $7x + 4 = x + 16$
8. $13x + 14 = 12x - 5$
9. $3(x - 2) + 7 = 2(x + 5)$
10. $2(x - 1) + 3 = x - 3(x + 1)$
11. $3(x - 4) - 4(x - 3) = x + 3 - (x - 2)$
12. $2 - (7x + 5) = 13 - 3x$
13. $16 = 3(x - 1) - (x - 7)$
14. $5x - (2x + 2) = x + (3x - 5)$
15. $25 - [2 + 5y - 3(y + 2)] = -3(2y - 5) - [5(y - 1) - 3y + 3]$
16. $45 - [4 - 2y - 4(y + 7)] = -4(1 + 3y) - [4 - 3(y + 2) - 2(2y - 5)]$

Exercises 17–30 contain linear equations with constants in denominators. Solve each equation.

17. $\frac{x}{3} = \frac{x}{2} - 2$
18. $\frac{x}{5} = \frac{x}{6} + 1$
19. $20 - \frac{x}{3} = \frac{x}{2}$
20. $\frac{x}{5} - \frac{1}{2} = \frac{x}{6}$
21. $\frac{3x}{5} = \frac{2x}{3} + 1$
22. $\frac{x}{2} = \frac{3x}{4} + 5$
23. $\frac{3x}{5} - x = \frac{x}{10} - \frac{5}{2}$
24. $2x - \frac{2x}{7} = \frac{x}{2} + \frac{17}{2}$
25. $\frac{x+3}{6} = \frac{3}{8} + \frac{x-5}{4}$
26. $\frac{x+1}{4} = \frac{1}{6} + \frac{2-x}{3}$
27. $\frac{x}{4} = 2 + \frac{x-3}{3}$
28. $5 + \frac{x-2}{3} = \frac{x+3}{8}$
29. $\frac{x+1}{3} = 5 - \frac{x+2}{7}$
30. $\frac{3x}{5} - \frac{x-3}{2} = \frac{x+2}{3}$
31. $\frac{4}{x} = \frac{5}{2x} + 3$
32. $\frac{5}{x} = \frac{10}{3x} + 4$
33. $\frac{2}{x} + 3 = \frac{5}{2x} + \frac{13}{4}$
34. $\frac{7}{2x} - \frac{5}{3x} = \frac{22}{3}$
35. $\frac{2}{3x} + \frac{1}{4} = \frac{11}{6x} - \frac{1}{3}$
36. $\frac{5}{2x} - \frac{8}{9} = \frac{1}{18} - \frac{1}{3x}$
37. $\frac{x-2}{2x} + 1 = \frac{x+1}{x}$
38. $\frac{4}{x} = \frac{9}{5} - \frac{7x-4}{5x}$
39. $\frac{1}{x-1} + 5 = \frac{11}{x-1}$
40. $\frac{3}{x+4} - 7 = \frac{-4}{x+4}$
41. $\frac{8x}{x+1} = 4 - \frac{8}{x+1}$
42. $\frac{2}{x-2} = \frac{x}{x-2} - 2$
43. $\frac{3}{2x-2} + \frac{1}{2} = \frac{2}{x-1}$

Exercises 31–50 contain rational equations with variables in denominators. For each equation, **a**. Write the value or values of the variable that make a denominator zero. These are the restrictions on the variable. **b**. Keeping the restrictions in mind, solve the equation.

44. $\frac{3}{x+3} = \frac{5}{2x+6} + \frac{1}{x-2}$

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

46. $\frac{5}{x+2} + \frac{3}{x-2} = \frac{12}{(x+2)(x-2)}$

47. $\frac{2}{x+1} - \frac{1}{x-1} = \frac{2x}{x^2-1}$

48. $\frac{4}{x+5} + \frac{2}{x-5} = \frac{32}{x^2-25}$

49. $\frac{1}{x-4} - \frac{5}{x+2} = \frac{6}{x^2-2x-8}$

50. $\frac{6}{x+3} - \frac{5}{x-2} = \frac{-20}{x^2+x-6}$

In Exercises 51–56, find all values of x satisfying the given conditions.

51. $y_1 = 5(2x-8) - 2$, $y_2 = 5(x-3) + 3$, and $y_1 = y_2$.

52. $y_1 = 7(3x-2) + 5$, $y_2 = 6(2x-1) + 24$, and $y_1 = y_2$.

53. $y_1 = \frac{x-3}{5}$, $y_2 = \frac{x-5}{4}$, and $y_1 - y_2 = 1$.

54. $y_1 = \frac{x+1}{4}$, $y_2 = \frac{x+2}{3}$, and $y_1 - y_2 = -4$.

55. $y_1 = \frac{5}{x+4}$, $y_2 = \frac{3}{x+3}$, $y_3 = \frac{12x+19}{x^2+7x+12}$, and $y_1 + y_2 = y_3$.

56. $y_1 = \frac{2x-1}{x^2+2x-8}$, $y_2 = \frac{2}{x+4}$, $y_3 = \frac{1}{x-2}$, and $y_1 + y_2 = y_3$.

In Exercises 57–60, find all values of x such that $y = 0$.

57. $y = 4[x - (3-x)] - 7(x+1)$

58. $y = 2[3x - (4x-6)] - 5(x-6)$

59. $y = \frac{x+6}{3x-12} - \frac{5}{x-4} - \frac{2}{3}$

60. $y = \frac{1}{5x+5} - \frac{3}{x+1} + \frac{7}{5}$

In Exercises 61–68, determine whether each equation is an identity, a conditional equation, or an inconsistent equation.

61. $4(x-7) = 4x-28$

62. $4(x-7) = 4x+28$

63. $2x+3 = 2x-3$

64. $\frac{7x}{x} = 7$

65. $4x+5x = 8x$

66. $8x+2x = 9x$

67. $\frac{2x}{x-3} = \frac{6}{x-3} + 4$

68. $\frac{3}{x-3} = \frac{x}{x-3} + 3$

The equations in Exercises 69–80 combine the types of equations we have discussed in this section. Solve each equation. Then state whether the equation is an identity, a conditional equation, or an inconsistent equation.

69. $\frac{x+5}{2} - 4 = \frac{2x-1}{3}$

70. $\frac{x+2}{7} = 5 - \frac{x+1}{3}$

71. $\frac{2}{x-2} = 3 + \frac{x}{x-2}$

72. $\frac{6}{x+3} + 2 = \frac{-2x}{x+3}$

73. $8x - (3x+2) + 10 = 3x$

74. $2(x+2) + 2x = 4(x+1)$

75. $\frac{2}{x} + \frac{1}{2} = \frac{3}{4}$

76. $\frac{3}{x} - \frac{1}{6} = \frac{1}{3}$

77. $\frac{4}{x-2} + \frac{3}{x+5} = \frac{7}{(x+5)(x-2)}$

78. $\frac{1}{x-1} = \frac{1}{(2x+3)(x-1)} + \frac{4}{2x+3}$

79. $\frac{4x}{x+3} - \frac{12}{x-3} = \frac{4x^2+36}{x^2-9}$

80. $\frac{4}{x^2+3x-10} - \frac{1}{x^2+x-6} = \frac{3}{x^2-x-12}$

In Exercises 81–84, use the $\boxed{Y=}$ screen to write the equation being solved. Then use the table to solve the equation.

81.

	Plot1	Plot2	Plot3
$\boxed{Y_1}$	$\blacksquare 3(x-4)$		
$\boxed{Y_2}$		$\blacksquare 3(2-2x)$	
$\boxed{Y_3}$	X	Y_1	Y_2
	-3	-21	24
$\boxed{Y_4}$		-18	18
$\boxed{Y_5}$	-2	-15	12
$\boxed{Y_6}$	-1	-12	6
$\boxed{Y_7}$	0	-9	0
	1	-6	-6
	2	-3	-12
	3		
X=	-3		

82.

	Plot1	Plot2	Plot3
$\boxed{Y_1}$	$\blacksquare 3(2x-5)$		
$\boxed{Y_2}$		$\blacksquare 5x+2$	
$\boxed{Y_3}$	X	Y_1	Y_2
	13	63	67
$\boxed{Y_4}$		69	72
$\boxed{Y_5}$	14	75	77
$\boxed{Y_6}$	15	81	82
$\boxed{Y_7}$	16	87	87
	17	93	92
	18	99	97
X=	13		

83.

	Plot1	Plot2	Plot3
$\boxed{Y_1}$	$\blacksquare -3(x-3)$		
$\boxed{Y_2}$		$\blacksquare 5(2-x)$	
$\boxed{Y_3}$	X	Y_1	Y_2
	3	12	15
$\boxed{Y_4}$		10.5	12.5
$\boxed{Y_5}$	-5	9	10
$\boxed{Y_6}$	0	7.5	7.5
$\boxed{Y_7}$.5	6	5
	1	4.5	2.5
	1.5	3	0
X=	-1		

84.

	Plot1	Plot2	Plot3
$\boxed{Y_1}$	$\blacksquare 2x-5$		
$\boxed{Y_2}$		$\blacksquare 4(3x+1)-2$	
$\boxed{Y_3}$	X	Y_1	Y_2
	-1	-7	-10
$\boxed{Y_4}$		-6.8	-8.8
$\boxed{Y_5}$	-0.8	-6.6	-7.6
$\boxed{Y_6}$	-0.2	-6.4	-6.4
$\boxed{Y_7}$	-0.6	-6.2	-5.2
	-1.5	-6	-4
	-1.4	-5.8	-2.8
X=	-1		