(c)

$$
\begin{aligned}
3(2x - 5a) + 4b &= 4x - 2 && \text{Solve for } x.\\
6x - 15a + 4b &= 4x - 2 && \text{Distributive property}\\
6x - 4x &= 15a - 4b - 2 && \text{Isolate the } x\text{-terms on one side.}\\
2x &= 15a - 4b - 2 && \text{Combine terms.}\\
x &= \frac{15a - 4b - 2}{2} && \text{Divide by 2.}
\end{aligned}
$$

Now try Exercises 39, 43, and 49.

EXAMPLE 5 Applying the Simple Interest Formula

Laquanda Nelson borrowed \$5240 for new furniture. She will pay it off in 11 months at an annual interest rate of 4.5%. How much interest will she pay?

Solution Here, $r = .045$, $P = 5240$, and $t = \frac{11}{12}$ (year). Using the formula,

$$I = Prt = 5240(.045)\left(\frac{11}{12}\right) = \$216.15.$$

She will pay \$216.15 interest on her purchase.

Now try Exercise 59.

.1 Exercises

true **2.** true **3.** false
false **7.** B **9.** $\{-4\}$
$\{-5\}$ **11.** $\{1\}$ **12.** $\{-1\}$
$\left\{-\frac{2}{7}\right\}$ **14.** $\left\{\frac{5}{12}\right\}$
$\left\{-\frac{7}{8}\right\}$ **16.** $\left\{-\frac{6}{11}\right\}$

Concept Check *In Exercises 1–4, decide whether each statement is* true *or* false.

1. The solution set of $2x + 3 = x - 5$ is $\{-8\}$.

2. The equation $5(x - 9) = 5x - 45$ is an example of an identity.

3. The equations $x^2 = 4$ and $x + 1 = 3$ are equivalent equations.

4. It is possible for a linear equation to have exactly two solutions.

5. Explain the difference between an identity and a conditional equation.

6. Make a complete list of the steps needed to solve a linear equation. (Some equations will not require every step.)

7. ***Concept Check*** Which one is not a linear equation?

A. $5x + 7(x - 1) = -3x$ **B.** $8x^2 - 4x + 3 = 0$
C. $7x + 8x = 13x$ **D.** $.04x - .08x = .40$

8. In solving the equation $3(2x - 4) = 6x - 12$, a student obtains the result $0 = 0$ and gives the solution set $\{0\}$. Is this correct? Explain.

Solve each equation. See Examples 1 and 2.

9. $5x + 2 = 3x - 6$

10. $9x + 1 = 7x - 9$

11. $6(3x - 1) = 8 - (10x - 14)$

12. $4(-2x + 1) = 6 - (2x - 4)$

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

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

15. $3x + 2 - 5(x + 1) = 6x + 4$

16. $5(x + 3) + 4x - 5 = -(2x - 4)$

17. $2[x-(4+2x)+3]=2x+2$

18. $4[2x-(3-x)+5]=-7x-2$

19. $\frac{1}{7}(3x-2)=\frac{x+10}{5}$

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

21. $.2x-.5=.1x+7$

22. $.01x+3.1=2.03x-2.96$

23. $-4(2x-6)+7x=5x+24$

24. $-8(3x+4)+2x=4(x-8)$

25. $.5x+\frac{4}{3}x=x+10$

26. $\frac{2}{3}x+.25x=x+2$

27. $.08x+.06(x+12)=7.72$

28. $.04(x-12)+.06x=1.52$

Decide whether each equation is an identity, *a* conditional equation, *or a* contradiction. *Give the solution set. See Example 3.*

29. $4(2x+7)=2x+25+3(2x+1)$

30. $\frac{1}{2}(6x+14)=x+1+2(x+3)$

31. $2(x-7)=3x-14$

32. $-8(x+3)=-8x-5(x+1)$

33. $.3(x+2)-.5(x+2)=-.2x-.4$

34. $-.3(x-5)+.4(x-6)=.1x-.9$

35. $8(x+7)=4(x+12)+4(x+1)$

36. $-6(2x+1)-3(x-4)=-15x+1$

37. A student claims that the equation $5x=4x$ is a contradiction, since dividing both sides by x leads to $5=4$, a false statement. Explain why the student is incorrect.

38. If $k\neq 0$, is the equation $x+k=x$ a contradiction, a conditional equation, or an identity? Explain.

Solve each formula for the indicated variable. Assume that the denominator is not 0 if variables appear in the denominator. See Examples 4(a) and (b).

39. $V=lwh$ for l (volume of a rectangular box)

40. $I=Prt$ for P (simple interest)

41. $P=a+b+c$ for c (perimeter of a triangle)

42. $P=2l+2w$ for w (perimeter of a rectangle)

43. $A=\frac{1}{2}(B+b)h$ for B (area of a trapezoid)

44. $A=\frac{1}{2}(B+b)h$ for h (area of a trapezoid)

45. $S=2\pi rh+2\pi r^2$ for h (surface area of a right circular cylinder)

46. $s=\frac{1}{2}gt^2$ for g (distance traveled by a falling object)

47. $S=2lw+2wh+2hl$ for h (surface area of a rectangular box)

48. Refer to Exercise 45. Why is it not possible to solve this formula for r using the methods of this section?

Solve each equation for x. See Example 4(c).

49. $2(x-a)+b=3x+a$

50. $5x-(2a+c)=a(x+1)$

51. $ax+b=3(x-a)$

52. $4a-ax=3b+bx$

53. $\frac{x}{a-1}=ax+3$

54. $\frac{2a}{x-1}=a-b$

55. $a^2x+3x=2a^2$

56. $ax+b^2=bx-a^2$

57. $3x=(2x-1)(m+4)$

58. $-x=(5x+3)(3k+1)$

{−1} **18.** $\left\{-\frac{10}{19}\right\}$
{10} **20.** {−5} **21.** {75}
{3} **23.** {0} **24.** {0}
{12} **26.** {−24} **27.** {50}
{20}
identity; {all real numbers}
identity; {all real numbers}
conditional equation; {0}
conditional equation; $\left\{\frac{19}{5}\right\}$
identity; {all real numbers}
identity; {all real numbers}
contradiction; ∅
contradiction; ∅
$l=\frac{V}{wh}$ **40.** $P=\frac{I}{rt}$
$c=P-a-b$
$w=\frac{P-2l}{2}$ or $w=\frac{P}{2}-l$
$B=\frac{2A-hb}{h}$ or $B=\frac{2A}{h}-b$
$h=\frac{2A}{B+b}$
$h=\frac{S-2\pi r^2}{2\pi r}$ or $h=\frac{S}{2\pi r}-r$
$g=\frac{2s}{t^2}$ **47.** $h=\frac{S-2lw}{2w+2l}$
swers in Exercises 49–58 exist
equivalent forms as well.
. $x=-3a+b$
. $x=\frac{3a+c}{5-a}$
. $x=\frac{3a+b}{3-a}$
. $x=\frac{4a-3b}{b+a}$
. $x=\frac{3-3a}{a^2-a-1}$
. $x=\frac{3a-b}{a-b}$
. $x=\frac{2a^2}{a^2+3}$
. $x=\frac{a^2+b^2}{b-a}$
7. $x=\frac{m+4}{2m+5}$
8. $x=\frac{9k+3}{-6-15k}$