Intermediate Algebra 8th edition Tobey Solutions Manual

SKU: 9780134178967-SOLUTIONS

Chapter 2

2.1 Exercises

2. $2x+12=2(21)+12=54\neq -30$

No; 21 is not a root since replacing x with 21 does not give a true statement.

4. $5y+9=5\left(\frac{3}{5}\right)+9=3+9=12$

Yes: when you replace y by $\frac{3}{5}$ in the equation, you get a true statement.

6. Multiply each term of the equation by 100 to clear the decimals.

8. No; it would be easier to add $\frac{1}{4}$ to both sides of the equation since the coefficient of x is 1.

10.
$$\begin{aligned} 26+x&=-35\\ 26+x-26&=-35-26\\ x&=-61\end{aligned}$$
Check: $26+(-61)\stackrel{?}{=}-35$
$-35=-35$

12.
$$\begin{aligned} -16x&=-64\\ \frac{-16x}{-16}&=\frac{-64}{-16}\\ x&=4\end{aligned}$$
Check: $-16(4)\stackrel{?}{=}-64$
$-64=-64$

14.
$$\begin{aligned} -15x&=75\\ \frac{-15x}{-15}&=\frac{75}{-15}\\ x&=-5\end{aligned}$$
Check: $-15(-5)\stackrel{?}{=}75$
$75=75$

16.
$$\begin{aligned} 10x+3&=15\\ 10x+3-3&=15-3\\ 10x&=12\\ \frac{10x}{10}&=\frac{12}{10}\\ x&=\frac{6}{5}\text{ or }1\frac{1}{5}\text{ or }1.2\end{aligned}$$
Check: $10\left(\frac{6}{5}\right)+3\stackrel{?}{=}15$
$15=15$

18.
$$\begin{aligned} 16x+5&=10x-1\\ 16x-10x+5&=10x-10x-1\\ 6x+5&=-1\\ 6x+5-5&=-1-5\\ 6x&=-6\\ \frac{6x}{6}&=\frac{-6}{6}\\ x&=-1\end{aligned}$$
Check: $16(-1)+5\stackrel{?}{=}10(-1)-1$
$-16+5\stackrel{?}{=}-10-1$
$-11=-11$

20.
$$\begin{aligned} -11x-8&=2x+5\\ -11x-2x-8&=2x-2x+5\\ -13x-8&=5\\ -13x-8+8&=5+8\\ -13x&=13\\ \frac{-13x}{-13}&=\frac{13}{-13}\\ x&=-1\end{aligned}$$
Check: $-11(-1)-8\stackrel{?}{=}2(-1)+5$
$11-8\stackrel{?}{=}-2+5$
$3=3$

22.
$$\begin{aligned} 6a+5-a&=3a-9\\ 5a+5&=3a-9\\ 5a-3a+5&=3a-3a-9\\ 2a+5&=-9\\ 2a+5-5&=-9-5\\ 2a&=-14\\ \frac{2a}{2}&=\frac{-14}{2}\\ a&=-7\end{aligned}$$
Check: $6(-7)+5-(-7)\stackrel{?}{=}3(-7)-9$
$-42+5+7\stackrel{?}{=}-21-9$
$-30=-30$

24.
$$\begin{aligned} 3(5-y)&=3(y+4)\\ 15-3y&=3y+12\\ 15-3y-3y&=3y-3y+12\\ 15-6y&=12\\ 15-15-6y&=12-15\\ -6y&=-3\\ \frac{-6y}{-6}&=\frac{-3}{-6}\\ y&=\frac{1}{2}\text{ or }0.5\end{aligned}$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

Check: $3\left(5-\frac{1}{2}\right) \stackrel{?}{=} 3\left(\frac{1}{2}+4\right)$

$3\left(\frac{9}{2}\right) \stackrel{?}{=} 3\left(\frac{9}{2}\right)$

$\frac{27}{2} = \frac{27}{2}$

26. $4y+5 = 6(y+3)-y$

$4y+5 = 6y+18-y$

$4y+5 = 5y+18$

$4y-5y+5 = 5y-5y+18$

$-y+5 = 18$

$-y+5-5 = 18-5$

$-y = 13$

$y = -13$

Check: $4(-13)+5 \stackrel{?}{=} 6(-13+3)-(-13)$

$-52+5 \stackrel{?}{=} 6(-10)+13$

$-47 \stackrel{?}{=} -60+13$

$-47 = -47$

28. $-\frac{5}{6}x = 5$

$-\frac{5}{6}x\left(-\frac{6}{5}\right) = 5\left(-\frac{6}{5}\right)$

$x = -6$

Check: $-\frac{5}{6}(-6) \stackrel{?}{=} 5$

$5 = 5$

30. $\frac{y}{3}+2 = \frac{4}{5}$

$15\left(\frac{y}{3}+2\right) = 15\left(\frac{4}{5}\right)$

$5y+30 = 12$

$5y+30-30 = 12-30$

$5y = -18$

$\frac{5y}{5} = \frac{-18}{5}$

$y = -\frac{18}{5}$ or $-3\frac{3}{5}$ or -3.6

Check: $\frac{-3.6}{3}+2 \stackrel{?}{=} \frac{4}{5}$

$-1.2+2 \stackrel{?}{=} 0.8$

$0.8 = 0.8$

32. $\frac{4x}{5}+\frac{3}{2} = 2x$

$10\left(\frac{4x}{5}+\frac{3}{2}\right) = 2x(10)$

$8x+15 = 20x$

$8x-8x+15 = 20x-8x$

$15 = 12x$

$\frac{15}{12} = \frac{12x}{12}$

$x = \frac{5}{4}$ or $1\frac{1}{4}$ or 1.25

Check: $\frac{4\left(\frac{5}{4}\right)}{5}+\frac{3}{2} \stackrel{?}{=} 2\left(\frac{5}{4}\right)$

$1+\frac{3}{2} \stackrel{?}{=} \frac{5}{2}$

$\frac{5}{2} = \frac{5}{2}$

34. $5-\frac{2}{3}(x+2) = 3$

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

$15-2(x+2) = 9$

$15-2x-4 = 9$

$-2x+11 = 9$

$-2x+11-11 = 9-11$

$-2x = -2$

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

$x = 1$

Check: $5-\frac{2}{3}(1+2) \stackrel{?}{=} 3$

$5-\frac{2}{3}(3) \stackrel{?}{=} 3$

$5-2 \stackrel{?}{=} 3$

$3 = 3$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

36. $6+2(x-1)=\frac{3x}{5}+4$

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

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

$5(2x+4)=5\left(\frac{3x}{5}+4\right)$

$10x+20=3x+20$

$10x-3x+20=3x-3x+20$

$7x+20=20$

$7x+20-20=20-20$

$7x=0$

$\frac{7x}{7}=\frac{0}{7}$

$x=0$

Check: $6+2(0-1)\stackrel{?}{=}\frac{3(0)}{5}+4$

$6+(-2)\stackrel{?}{=}0+4$

$4=4$

38. $0.8x-0.1=0.4x+0.7$

$10(0.8x-0.1)=10(0.4x+0.7)$

$8x-1=4x+7$

$8x-4x-1=4x-4x+7$

$4x-1=7$

$4x-1+1=7+1$

$4x=8$

$\frac{4x}{4}=\frac{8}{4}$

$x=2$

Check: $0.8(2)-0.1\stackrel{?}{=}0.4(2)+0.7$

$1.6-0.1\stackrel{?}{=}0.8+0.7$

$1.5=1.5$

40. $0.1x-0.12=0.04x+0.03$

$100(0.1x-0.12)=100(0.04x+0.03)$

$10x-12=4x+3$

$10x-4x-12=4x-4x+3$

$6x-12=3$

$6x-12+12=3+12$

$6x=15$

$\frac{6x}{6}=\frac{15}{6}$

$x=2.5$ or $2\frac{1}{2}$ or $\frac{5}{2}$

Check: $0.1(2.5)-0.12\stackrel{?}{=}0.04(2.5)+0.03$

$0.25-0.12\stackrel{?}{=}0.1+0.03$

$0.13=0.13$

42. $0.5(3x+5)=1$

$1.5x+2.5=1$

$10(1.5x+2.5)=10(1)$

$15x+25=10$

$15x+25-25=10-25$

$15x=-15$

$\frac{15x}{15}=\frac{-15}{15}$

$x=-1$

Check: $0.5[3(-1)+5]\stackrel{?}{=}1$

$0.5[-3+5]\stackrel{?}{=}1$

$0.5[2]\stackrel{?}{=}1$

$1=1$

44. $0.3(x+2)-2=0.05x$

$0.3x+0.6-2=0.05x$

$100(0.3x+0.6-2)=100(0.05x)$

$30x+60-200=5x$

$30x-140=5x$

$30x-140+140=5x+140$

$30x-5x=5x-5x+140$

$25x=140$

$\frac{25x}{25}=\frac{140}{25}$

$x=5.6$ or $\frac{28}{5}$ or $5\frac{3}{5}$

Check: $0.3(5.6+2)-2\stackrel{?}{=}0.05(5.6)$

$2.28-2\stackrel{?}{=}0.28$

$0.28=0.28$

46. $8y+15-4y=20-13$

$4y+15=7$

$4y+15-15=7-15$

$4y=-8$

$\frac{4y}{4}=\frac{-8}{4}$

$y=-2$

48. $\frac{1}{2}-\frac{x}{8}=\frac{x-3}{4}$

$8\left(\frac{1}{2}-\frac{x}{8}\right)=8\left(\frac{x-3}{4}\right)$

$4-x=2(x-3)$

$4-x=2x-6$

$4-x+x=2x+x-6$

$4=3x-6$

$4+6=3x-6+6$

$10=3x$

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

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

50.
$$\frac{y+5}{12}=\frac{3}{4}-\frac{y+1}{8}$$
$$24\left(\frac{y+5}{12}\right)=24\left(\frac{3}{4}-\frac{y+1}{8}\right)$$
$$2(y+5)=6(3)-3(y+1)$$
$$2y+10=18-3y-3$$
$$2y+10=15-3y$$
$$2y+3y+10=15-3y+3y$$
$$5y+10=15$$
$$5y+10-10=15-10$$
$$5y=5$$
$$\frac{5y}{5}=\frac{5}{5}$$
$$y=1$$

52.
$$1.7+3(0.2x-0.3)=0.2(4-x)$$
$$1.7+0.6x-0.9=0.8-0.2x$$
$$10(1.7+0.6x-0.9)=10(0.8-0.2x)$$
$$17+6x-9=8-2x$$
$$8+6x=8-2x$$
$$8+6x+2x=8-2x+2x$$
$$8+8x=8$$
$$8-8+8x=8-8$$
$$8x=0$$
$$\frac{8x}{8}=\frac{0}{8}$$
$$x=0$$

54.
$$7x-5=-2x-15+10x+6$$
$$7x-5=8x-9$$
$$7x-8x-5=8x-8x-9$$
$$-x-5=-9$$
$$-x-5+5=-9+5$$
$$-x=-4$$
$$x=4$$

56.
$$3x-17=8x-5(x-2)$$
$$3x-17=8x-5x+10$$
$$3x-17=3x+10$$
$$3x-3x-17=3x-3x+10$$
$$-17=10 \Rightarrow \text{since } -17\neq 10,$$
no solution

58.
$$8(x+2)-7=3(x+3)+5x$$
$$8x+16-7=3x+9+5x$$
$$8x+9=8x+9$$
$$8x-8x+9=8x-8x+9$$
$$9=9$$
Any real number is a solution.

60.
$$2x+4(x-5)=-x+7(x-1)+3$$
$$2x+4x-20=-x+7x-7+3$$
$$6x-20=6x-4$$
$$6x-6x-20=6x-6x-4$$
$$-20=-4 \Rightarrow \text{since } -20\neq -4,$$
no solution.

62.
$$x+\frac{2x+8}{3}=\frac{5x+5}{3}+1$$
$$3\left(x+\frac{2x+8}{3}\right)=3\left(\frac{5x+5}{3}+1\right)$$
$$3x+2x+8=5x+5+3$$
$$5x+8=5x+8$$
$$5x-5x+8=5x-5x+8$$
$$8=8$$
Any real number is a solution.

Cumulative Review

63.
$$5-(4-2)^2+3(-2)=5-(2)^2+(-6)$$
$$=5-4+(-6)$$
$$=1+(-6)$$
$$=-5$$

64.
$$(-2)^4-12-6(-2)=16-12+(-6)(-2)$$
$$=16-12+12$$
$$=4+12$$
$$=16$$

65.
$$\left(\frac{3xy^2}{2x^2y}\right)^3=\frac{3^3x^3y^{2\cdot 3}}{2^3x^{2\cdot 3}y^3}$$
$$=\frac{27x^3y^6}{8x^6y^3}$$
$$=\frac{27y^{6-3}}{8x^{6-3}}$$
$$=\frac{27y^3}{8x^3}$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

66. $(2x^{-2}y^{-3})^2(4xy^{-2})^{-2}$

$= 2^2 x^{-2\cdot 2} y^{-3\cdot 2} \cdot 4^{-2} x^{-2} y^{-2(-2)}$

$= 4x^{-4}y^{-6} \cdot \frac{1}{16} \cdot x^{-2}y^4$

$= \frac{4}{16} x^{-4-2} y^{-6+4}$

$= \frac{1}{4} x^{-6} y^{-2}$

$= \frac{1}{4x^6 y^2}$

Classroom Quiz 2.1

1. $3(8-2x) = 10-4(x-3)$

$24-6x = 10-4x+12$

$24-6x = 22-4x$

$24-6x+4x = 22-4x+4x$

$24-2x = 22$

$24-24-2x = 22-24$

$-2x = -2$

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

$x = 1$

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

$4\left[\frac{3}{4}(x-1)+2\right] = 4[2(x-4)]$

$3(x-1)+4\cdot 2 = 8(x-4)$

$3x-3+8 = 8x-32$

$3x+5 = 8x-32$

$3x-8x+5 = 8x-8x-32$

$-5x+5 = -32$

$-5x+5-5 = -32-5$

$-5x = -37$

$\frac{-5x}{-5} = \frac{-37}{-5}$

$x = \frac{37}{5}$ or $7\frac{2}{5}$ or 7.4

3. $0.6x+1.2 = 4x-3.56$

$100(0.6x+1.2) = 100(4x-3.56)$

$60x+120 = 400x-356$

$60x-400x+120 = 400x-400x-356$

$-340x+120 = -356$

$-340x+120-120 = -356-120$

$-340x = -476$

$\frac{-340x}{-340} = \frac{-476}{-340}$

$x = 1.4$ or $\frac{7}{5}$ or $1\frac{2}{5}$

2.2 Exercises

2. $9x+y = 4$

$9x = 4-y$

$x = \frac{4-y}{9}$

4. $7x-9 = 6y-x$

$7x+x = 6y+9$

$8x = 6y+9$

$x = \frac{6y+9}{8}$

6. $y = -\frac{1}{4}x+3$

$4(y) = 4\left(-\frac{1}{4}x+3\right)$

$4y = -x+12$

$x = 12-4y$

8. $x = \frac{5}{8}y-\frac{1}{4}$

$8x = 8\left(\frac{5}{8}y-\frac{1}{4}\right)$

$8x = 5y-2$

$8x+2 = 5y$

$\frac{8x+2}{5} = y$

10. $V = lwh$

$\frac{V}{lh} = \frac{lwh}{lh}$

$\frac{V}{lh} = w$ or $w = \frac{V}{lh}$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

12.
$$C = \frac{5}{9}(F-32)$$
$$9C = 5(F-32)$$
$$9C = 5F-160$$
$$9C+160 = 5F$$
$$\frac{9C+160}{5} = F$$

14.
$$V = \pi r^2 h$$
$$\frac{V}{\pi r^2} = \frac{\pi r^2 h}{\pi r^2}$$
$$\frac{V}{\pi r^2} = h$$

16.
$$H = \frac{3}{4}(5a+b)$$
$$4H = 3(5a+b)$$
$$4H = 15a+3b$$
$$4H-3b = 15a$$
$$\frac{4H-3b}{15} = a$$

18.
$$4(-ax+2y) = 5ax+y$$
$$-4ax+8y = 5ax+y$$
$$-4ax-5ax = y-8y$$
$$-9ax = -7y$$
$$x = \frac{-7y}{-9a} = \frac{7y}{9a}$$

20. a.
$$F = \frac{9}{5}C+32$$
$$5F = 5\left(\frac{9}{5}C+32\right)$$
$$5F = 9C+160$$
$$5F-160 = 9C$$
$$C = \frac{5F-160}{9}$$

b. $C = \dfrac{5F-160}{9} = \dfrac{5(23)-160}{9} = -5°$

22. a.
$$V = \frac{1}{3}\pi r^2 h$$
$$3V = \pi r^2 h$$
$$\frac{3V}{\pi r^2} = h$$

b. $h = \dfrac{3V}{\pi r^2} \approx \dfrac{3(6.28)}{3.14(3)^2} = \dfrac{2}{3}$

24.
$$y = 0.27x+72$$
$$y-72 = 0.27x$$
$$\frac{y-72}{0.27} = x \text{ or } x = \frac{100y-7200}{27}$$
$y = 87$: $x = \dfrac{100(87)-7200}{27} = \dfrac{1500}{27} \approx 55.6$

1970 + 55.6 = 2025.6
Life expectancy in Japan is expected to be 87 years in 2025.

26. a.
$$ND = 0.95T$$
$$N = \frac{0.95T}{D}$$

b. $D = 30$, $T = 6 \cdot 60 = 360$
$$N = \frac{0.95(360)}{30} = 11.4 \approx 11$$
She should schedule 11 patient appointments.

28. a.
$$C = 0.7649D+6.1275$$
$$C-6.1275 = 0.7649D$$
$$D = \frac{C-6.1275}{0.7649}$$

b. $D = \dfrac{12.48-6.1275}{0.7649} \approx 8.3$
The disposable income is $8.3 billion.

Cumulative Review

29.
$$(2x^{-3}y)^{-2} = 2^{-2}x^{-3(-2)}y^{-2}$$
$$= 2^{-2}x^6y^{-2}$$
$$= \frac{x^6}{2^2y^2}$$
$$= \frac{x^6}{4y^2}$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

30. $\left(\dfrac{5x^2y^{-3}}{x^{-4}y^2}\right)^{-3} = \dfrac{5^{-3}x^{2(-3)}y^{-3(-3)}}{x^{-4(-3)}y^{2(-3)}}$

$= \dfrac{5^{-3}x^{-6}y^{9}}{x^{12}y^{-6}}$

$= \dfrac{y^{9+6}}{5^3x^{12+6}}$

$= \dfrac{y^{15}}{125x^{18}}$

31. $1+16\div(2-4)^3-3 = 1+16\div(-2)^3-3$

$= 1+16\div(-8)-3$

$= 1+(-2)-3$

$= -1-3$

$= -4$

32. $2[a-(3-2b)]+5a = 2(a-3+2b)+5a$

$= 2a-6+4b+5a$

$= 7a+4b-6$

33. \$5000 investment: $I = prt = 5000(0.05)(1) = 250$
\$4000 investment: $I = prt = 4000(0.09)(1) = 360$
Total = \$5000 + \$250 + \$4000 + \$360 = \$9610
They would have \$9610 after 1 year.

34. $\dfrac{46,622.1-45,711.3}{9.9+11.7+10.6+5.8+8} = \dfrac{910.8}{46} = 19.8$
The car got 19.8 miles per gallon.

Classroom Quiz 2.2

1. $A = 3b+6(x-2)$

$A = 3b+6x-12$

$A-3b+12 = 6x$

$\dfrac{A-3b+12}{6} = \dfrac{6x}{6}$

$x = \dfrac{A-3b+12}{6}$

2. $M = \dfrac{2}{3}gh$

$\dfrac{3}{2}M = gh$

$\dfrac{3M}{2g} = h$ or $h = \dfrac{3M}{2g}$

3. $B = 3a+\dfrac{3}{4}w-\dfrac{1}{8}$

$8B = 8\left(3a+\dfrac{3}{4}w-\dfrac{1}{8}\right)$

$8B = 24a+6w-1$

$8B-24a+1 = 6w$

$\dfrac{8B-24a+1}{6} = \dfrac{6w}{6}$

$w = \dfrac{8B-24a+1}{6}$

2.3 Exercises

2. It could happen if $b = 0$. Then $-b$ and b would be the same number.

4. You must first isolate the absolute value expression. To do this you add −5 to each side of the equation. The result will be $|3x - 1| = 9$. then you solve the two equations $3x - 1 = 9$ and $3x - 1 = -9$. The final answer is $x = \dfrac{10}{3}$, $x = -\dfrac{8}{3}$.

6. $|x| = 14$

$x = 14$ or $x = -14$

Check: $|14| \stackrel{?}{=} 14$ $\quad$ $|-14| \stackrel{?}{=} 14$

$14 = 14$ $\quad$ $14 = 14$

8. $|x+6| = 13$

$x+6 = 13$ or $x+6 = -13$

$x = 7$ $\quad$ $x = -19$

Check: $|7+6| \stackrel{?}{=} 13$ $\quad$ $|-19+6| \stackrel{?}{=} 13$

$|13| \stackrel{?}{=} 13$ $\quad$ $|-13| \stackrel{?}{=} 13$

$13 = 13$ $\quad$ $13 = 13$

10. $|4x-7| = 9$

$4x-7 = 9$ or $4x-7 = -9$

$4x = 16$ $\quad$ $4x = -2$

$x = 4$ $\quad$ $x = \dfrac{-2}{4} = -\dfrac{1}{2}$

Check: $|4(4)-7| \stackrel{?}{=} 9$ $\quad$ $\left|4\left(-\dfrac{1}{2}\right)-7\right| \stackrel{?}{=} 9$

$|16-7| \stackrel{?}{=} 9$ $\quad$ $|-2-7| \stackrel{?}{=} 9$

$|9| \stackrel{?}{=} 9$ $\quad$ $|-9| \stackrel{?}{=} 9$

$9 = 9$ $\quad$ $9 = 9$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

12. $|3-x|=7$

$3-x=7$ or $3-x=-7$

$-x=4$ $\quad -x=-10$

$x=-4$ $\quad x=10$

Check: $|3-(-4)| \stackrel{?}{=} 7$ $\quad |3-10| \stackrel{?}{=} 7$

$|3+4| \stackrel{?}{=} 7$ $\quad |-7| \stackrel{?}{=} 7$

$|7| \stackrel{?}{=} 7$ $\quad 7=7$

$7=7$

14. $\left|\frac{1}{4}x+5\right|=3$

$\frac{1}{4}x+5=3$ or $\frac{1}{4}x+5=-3$

$x+20=12$ $\quad x+20=-12$

$x=-8$ $\quad x=-32$

Check: $\left|\frac{1}{4}(-8)+5\right| \stackrel{?}{=} 3$ $\quad \left|\frac{1}{4}(-32)+5\right| \stackrel{?}{=} 3$

$|-2+5| \stackrel{?}{=} 3$ $\quad |-8+5| \stackrel{?}{=} 3$

$|3| \stackrel{?}{=} 3$ $\quad |-3| \stackrel{?}{=} 3$

$3=3$ $\quad 3=3$

16. $|2.4-0.8x|=2$

$2.4-0.8x=2$ or $2.4-0.8x=-2$

$24-8x=20$ $\quad 24-8x=-20$

$-8x=-4$ $\quad -8x=-44$

$x=\frac{-4}{-8}=\frac{1}{2}$ $\quad x=\frac{-44}{-8}=\frac{11}{2}$

Check: $\left|2.4-0.8\left(\frac{1}{2}\right)\right| \stackrel{?}{=} 2$ $\quad \left|2.4-0.8\left(\frac{11}{2}\right)\right| \stackrel{?}{=} 2$

$|2.4-0.4| \stackrel{?}{=} 2$ $\quad |2.4-4.4| \stackrel{?}{=} 2$

$|2| \stackrel{?}{=} 2$ $\quad |-2| \stackrel{?}{=} 2$

$2=2$ $\quad 2=2$

18. $|x+3|-4=8$

$|x+3|=12$

$x+3=12$ or $x+3=-12$

$x=9$ $\quad x=-15$

Check: $|9+3|-4 \stackrel{?}{=} 8$ $\quad |-15+3|-4 \stackrel{?}{=} 8$

$|12|-4 \stackrel{?}{=} 8$ $\quad |-12|-4 \stackrel{?}{=} 8$

$12-4 \stackrel{?}{=} 8$ $\quad 12-4 \stackrel{?}{=} 8$

$8=8$ $\quad 8=8$

20. $\left|\frac{2}{3}-\frac{1}{2}x\right|-2=-1$

$\left|\frac{2}{3}-\frac{1}{2}x\right|=1$

$\frac{2}{3}-\frac{1}{2}x=1$ or $\frac{2}{3}-\frac{1}{2}x=-1$

$4-3x=6$ $\quad 4-3x=-6$

$-3x=2$ $\quad -3x=-10$

$x=-\frac{2}{3}$ $\quad x=\frac{10}{3}$

Check:

$\left|\frac{2}{3}-\frac{1}{2}\cdot\frac{-2}{3}\right|-2 \stackrel{?}{=} -1$ $\quad \left|\frac{2}{3}-\frac{1}{2}\cdot\frac{10}{3}\right|-2 \stackrel{?}{=} -1$

$\left|\frac{2}{3}+\frac{1}{3}\right|-2 \stackrel{?}{=} -1$ $\quad \left|\frac{2}{3}-\frac{5}{3}\right|-2 \stackrel{?}{=} -1$

$|1|-2 \stackrel{?}{=} -1$ $\quad |-1|-2 \stackrel{?}{=} -1$

$1-2 \stackrel{?}{=} -1$ $\quad 1-2 \stackrel{?}{=} -1$

$-1=-1$ $\quad -1=-1$

22. $\left|5-\frac{7}{2}x\right|+1=11$

$\left|5-\frac{7}{2}x\right|=10$

$5-\frac{7}{2}x=10$ or $5-\frac{7}{2}x=-10$

$-\frac{7}{2}x=5$ $\quad -\frac{7}{2}x=-15$

$x=-\frac{10}{7}$ $\quad x=\frac{30}{7}$

Check: $\left|5-\frac{7}{2}\left(-\frac{10}{7}\right)\right|+1 \stackrel{?}{=} 11$

$|5+5|+1 \stackrel{?}{=} 11$

$|10|+1 \stackrel{?}{=} 11$

$10+1 \stackrel{?}{=} 11$

$11=11$

$\left|5-\frac{7}{2}\left(\frac{30}{7}\right)\right|+1 \stackrel{?}{=} 11$

$|5-15|+1 \stackrel{?}{=} 11$

$|-10|+1 \stackrel{?}{=} 11$

$10+1 \stackrel{?}{=} 11$

$11=11$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

24. $\left|\frac{2x-1}{4}\right| = \frac{1}{3}$

$\frac{2x-1}{4} = \frac{1}{3}$ or $\frac{2x-1}{4} = -\frac{1}{3}$

$6x-3=4$ $\quad$ $6x-3=-4$

$6x=7$ $\quad$ $6x=-1$

$x=\frac{7}{6}$ $\quad$ $x=-\frac{1}{6}$

Check: $\left|\frac{2\left(\frac{7}{6}\right)-1}{4}\right| \stackrel{?}{=} \frac{1}{3}$ $\quad$ $\left|\frac{2\left(-\frac{1}{6}\right)-1}{4}\right| \stackrel{?}{=} \frac{1}{3}$

$\left|\frac{1}{3}\right| \stackrel{?}{=} \frac{1}{3}$ $\quad$ $\left|-\frac{1}{3}\right| \stackrel{?}{=} \frac{1}{3}$

$\frac{1}{3}=\frac{1}{3}$ $\quad$ $\frac{1}{3}=\frac{1}{3}$

26. $|x-7| = |3x-1|$

$x-7=3x-1$ or $x-7=-(3x-1)$

$-2x-7=-1$ $\quad$ $x-7=-3x+1$

$-2x=6$ $\quad$ $4x-7=1$

$x=-3$ $\quad$ $4x=8$

$x=2$

28. $\left|\frac{2x+3}{3}\right| = |x+4|$

$\frac{2x+3}{3} = x+4$ or $\frac{2x+3}{3} = -(x+4) = -x-4$

$2x+3=3x+12$ $\quad$ $2x+3=-3x-12$

$-x+3=12$ $\quad$ $5x+3=-12$

$-x=9$ $\quad$ $5x=-15$

$x=-9$ $\quad$ $x=-3$

30. $|2.2x+2| = |1-2.8x|$

$2.2x+2=1-2.8x$ or $2.2x+2=-1+2.8x$

$22x+20=10-28x$ $\quad$ $22x+20=-10+28x$

$50x=-10$ $\quad$ $-6x=-30$

$x=-\frac{1}{5}$ $\quad$ $x=5$

32. $\left|\frac{2x}{5}+1\right| = |1-x|$

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

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

$\frac{7}{5}x=0$ $\quad$ $-\frac{3x}{5}=-2$

$x=0$ $\quad$ $x=\frac{10}{3}$

34. $|-0.74x-8.26| = 5.36$

$-0.74x-8.26=5.36$

$-0.74x=13.62$

$x\approx -18.41$

or

$-0.74x-8.26=-5.36$

$-0.74x=2.9$

$x\approx -3.92$

36. $|4(x-1)|+5=15$

$|4x-4|=10$

$4x-4=10$ or $4x-4=-10$

$4x=14$ $\quad$ $4x=-6$

$x=\frac{14}{4}=\frac{7}{2}$ $\quad$ $x=\frac{-6}{4}=-\frac{3}{2}$

Check: $\left|4\left(\frac{7}{2}-1\right)\right|+5 \stackrel{?}{=} 15$

$\left|4\left(\frac{5}{2}\right)\right|+5 \stackrel{?}{=} 15$

$|10|+5 \stackrel{?}{=} 15$

$10+5 \stackrel{?}{=} 15$

$15=15$

$\left|4\left(-\frac{3}{2}-1\right)\right|+5 \stackrel{?}{=} 15$

$\left|4\left(-\frac{5}{2}\right)\right|+5 \stackrel{?}{=} 15$

$|-10|+5 \stackrel{?}{=} 15$

$10+5 \stackrel{?}{=} 15$

$15=15$

38. $\left|\frac{3}{4}x+9\right| = 0$

$\frac{3}{4}x+9=0$

$3x+36=0$

$3x=-36$

$x=-12$

Check: $\left|\frac{3}{4}(-12)+9\right| \stackrel{?}{=} 0$

$|-9+9| \stackrel{?}{=} 0$

$|0| \stackrel{?}{=} 0$

$0=0$

40. $\left|\frac{3}{4}x-\frac{2}{3}\right| = -8$ has no solution because absolute value is ≥ 0.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

42. $\left|\frac{5x+1}{2}\right| = \frac{3}{4}$

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

$2(5x+1) = 3$ $\quad$ $2(5x+1) = -3$

$10x+2 = 3$ $\quad$ $10x+2 = -3$

$10x = 1$ $\quad$ $10x = -5$

$x = \frac{1}{10}$ $\quad$ $x = \frac{-5}{10} = -\frac{1}{2}$

Check: $\left|\frac{5\left(\frac{1}{10}\right)+1}{2}\right| \stackrel{?}{=} \frac{3}{4}$ $\quad$ $\left|\frac{5\left(-\frac{1}{2}\right)+1}{2}\right| \stackrel{?}{=} \frac{3}{4}$

$\left|\frac{\frac{1}{2}+1}{2}\right| \stackrel{?}{=} \frac{3}{4}$ $\quad$ $\left|\frac{-\frac{5}{2}+1}{2}\right| \stackrel{?}{=} \frac{3}{4}$

$\left|\frac{\frac{3}{2}}{2}\right| \stackrel{?}{=} \frac{3}{4}$ $\quad$ $\left|\frac{-\frac{3}{2}}{2}\right| \stackrel{?}{=} \frac{3}{4}$

$\frac{3}{4} = \frac{3}{4}$ $\quad$ $\frac{3}{4} = \frac{3}{4}$

Cumulative Review

43. $(3x^{-3}yz^0)\left(\frac{5}{3}x^4y^2\right) = 5x^{-3+4}y^{1+2}\cdot 1 = 5xy^3$

44. $\frac{\sqrt{3-2\cdot 1^2}+5}{4^2-2\cdot 3} = \frac{\sqrt{3-2}+5}{16-6}$

$= \frac{\sqrt{1}+5}{10}$

$= \frac{1+5}{10}$

$= \frac{6}{10}$

$= \frac{3}{5}$

Classroom Quiz 2.3

1. $|2x+5| = 55$

$2x+5 = 55$ or $2x+5 = -55$

$2x = 50$ $\quad$ $2x = -60$

$x = 25$ $\quad$ $x = -30$

2. $\left|\frac{3}{4}x-2\right|+3 = 10$

$\left|\frac{3}{4}x-2\right| = 7$

$\frac{3}{4}x-2 = 7$ or $\frac{3}{4}x-2 = -7$

$\frac{3}{4}x = 9$ $\quad$ $\frac{3}{4}x = -5$

$x = 12$ $\quad$ $x = -\frac{20}{3}$

3. $|3x-4| = |x+3|$

$3x-4 = x+3$ or $3x-4 = -(x+3)$

$2x-4 = 3$ $\quad$ $3x-4 = -x-3$

$2x = 7$ $\quad$ $4x-4 = -3$

$x = \frac{7}{2}$ $\quad$ $4x = 1$

$x = \frac{1}{4}$

2.4 Exercises

2. Let x = the number.

$\frac{5}{8}x = -75$

$5x = -600$

$x = -120$

The number is -120.

4. Let x = the monthly fee last year.

$98 = \frac{3}{2}x - 10$

$196 = 3x - 20$

$216 = 3x$

$72 = x$

Last year's monthly parking fee was \$72.

6. Let x = the number of days the car has been parked.

$78 + 24(x-2) = 174$

$78 + 24x - 48 = 174$

$30 + 24x = 174$

$24x = 144$

$x = 6$

The car has been parked for 6 days.

8. Let x = the number of bills paid.

$5.00(6) + 0.50x = 48.50$

$30 + 0.50x = 48.50$

$0.50x = 18.50$

$x = 37$

He paid 37 bills.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

10. Profit = Revenue − Cost.
For one year the profit must be
$120{,}000 \cdot 3 = 360{,}000$.
The revenue for one week is
$(5000 \cdot 4 \cdot 18) = 360{,}000$.
The cost for one week is
$55{,}000 \cdot 4 + 110{,}000 = 330{,}000$.
The profit for one week is
$360{,}000 - 330{,}000 = 30{,}000$.
Let x = the number of weeks on tour, then
$$30{,}000x = 360{,}000$$
$$x = 12$$
They need to be on tour 12 weeks each year.

12. Let x = the width of the driveway.
Then $2x + 15$ = the length of the driveway.
$$2W + 2L = P$$
$$2x + 2(2x + 15) = 120$$
$$2x + 4x + 30 = 120$$
$$6x = 90$$
$$x = 15$$
$2x + 15 = 2(15) + 15 = 45$
The width of the driveway is 15 feet and the length is 45 feet.

14. Let x = the length of equal sides.
$$x + x + 1.5x - 3 = 28.5$$
$$3.5x = 31.5$$
$$x = 9$$
$1.5x - 3 = 1.5(9) - 3 = 10.5$
The equal sides are each 9 centimeters and the third side is 10.5 centimeters.

Cumulative Review

15. $57 + 0 = 57$
Identity property of addition

16. $(2 \cdot 3) \cdot 9 = 2 \cdot (3 \cdot 9)$
Associative property of multiplication

17.
$$\begin{aligned} 7(-2) \div 7(-3) - 3 &= -14 \div 7(-3) - 3 \\ &= (-2)(-3) - 3 \\ &= 6 - 3 \\ &= 3 \end{aligned}$$

18.
$$\begin{aligned} (7-12)^3 - (-4) + 3^3 &= (-5)^3 + (4) + 27 \\ &= -125 + 4 + 27 \\ &= -94 \end{aligned}$$

Classroom Quiz 2.4

1. Let x = the number.
$$\frac{3}{5}x = -81$$
$$\frac{5}{3} \cdot \frac{3}{5}x = \frac{5}{3} \cdot (-81)$$
$$x = -135$$
The number is −135.

2. Let x = length of second side.
$3x$ = length of first side.
$x + 16$ = length of third side.
$$3x + x + x + 16 = 66$$
$$5x + 16 = 66$$
$$5x = 50$$
$$x = 10$$
$3x = 3(10) = 30$
$x + 16 = 10 + 16 = 26$
The first side is 30 meters, the second side is 10 meters, and the third side is 26 meters.

3. Let x = number of hours she parked in the garage.
$$7 + 2.50(x - 1) = 44.50$$
$$7 + 2.5x - 2.5 = 44.5$$
$$2.5x + 4.5 = 44.5$$
$$2.5x = 40$$
$$x = 16$$
She parked in the garage for 16 hours.

Use Math to Save Money

1. Apartment 1:
$\$800 + \$110 + \$90 + \$90 + \$25 = \$1115$
Apartment 2: $\$850 + \$90 + \$90 + \$25 = \$1055$
Apartment 3: $\$900 + \$110 + \$25 = \$1035$

2. Annual cost without free rent:
$\$1115 \times 12 = \$13{,}380$
Subtract one month's rent to find annual cost with free rent: $\$13{,}380 - \$800 = \$12{,}580$
Divide by 12 to find monthly cost:
$$\frac{\$12{,}580}{12} \approx \$1048.33$$

3. They should rent Apartment 3 since it has the lowest monthly expenses.

4. Divide the monthly expenses for Apartment 3 by 2.
$$\frac{\$1035}{2} = \$517.50$$
Each person's share is $517.50.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

How Am I Doing? Sections 2.1–2.4
(Available online through MyMathLab or from the Instructor's Resource Center.)

1.
$$\begin{aligned} 2x-1&=12x+36\\ 2x-12x-1&=12x-12x+36\\ -10x-1&=36\\ -10x-1+1&=36+1\\ -10x&=37\\ \frac{-10x}{-10}&=\frac{37}{-10}\end{aligned}$$
$$x=-3.7 \text{ or } -\frac{37}{10} \text{ or } -3\frac{7}{10}$$

2.
$$\begin{aligned} \frac{x-2}{4}&=\frac{1}{2}x+4\\ 4\left(\frac{x-2}{4}\right)&=4\left(\frac{1}{2}x+4\right)\\ x-2&=2x+16\\ x-2x-2&=2x-2x+16\\ -x-2&=16\\ -x-2+2&=16+2\\ -x&=18\\ x&=-18\end{aligned}$$

3.
$$\begin{aligned} 4(x-3)&=x+2(5x-1)\\ 4x-12&=x+10x-2\\ 4x-12&=11x-2\\ 4x-11x-12&=11x-11x-2\\ -7x-12&=-2\\ -7x-12+12&=-2+12\\ -7x&=10\end{aligned}$$
$$x=-\frac{10}{7}=-1\frac{3}{7}$$

4.
$$\begin{aligned} 0.6x+3&=0.5x-7\\ 10(0.6x+3)&=10(0.5x-7)\\ 6x+30&=5x-70\\ 6x-5x+30&=5x-5x-70\\ x+30&=-70\\ x+30-30&=-70-30\\ x&=-100\end{aligned}$$

5.
$$\begin{aligned} -5x+9y&=18\\ -5x+5x+9y&=5x+18\\ 9y&=5x+18\\ \frac{9y}{9}&=\frac{5x+18}{9}\end{aligned}$$
$$y=\frac{5x+18}{9} \quad \text{or} \quad y=\frac{5}{9}x+2$$

6.
$$\begin{aligned} 5ab-2b&=16ab-3(8+b)\\ 5ab-2b&=16ab-24-3b\\ -11ab&=-b-24\\ 11ab&=b+24\\ a&=\frac{b+24}{11b}\end{aligned}$$

7.
$$\begin{aligned} A&=P+Prt\\ Prt&=A-P\\ \frac{Prt}{Pt}&=\frac{A-P}{Pt}\\ r&=\frac{A-P}{Pt}\end{aligned}$$

8.
$$r=\frac{A-P}{Pt}$$
$$r=\frac{118-100}{(100)3}=\frac{18}{300}=\frac{3}{50} \text{ or } 0.06$$

9.
$$|5x+8|=3$$
$$\begin{aligned} 5x+8&=3 \quad \text{or} \quad 5x+8=-3\\ 5x&=-5 \qquad\quad 5x=-11\\ x&=-1 \qquad\quad x=-\frac{11}{5}\end{aligned}$$

10.
$$\begin{aligned} |9-x|+2&=5\\ |9-x|+2-2&=5-2\\ |9-x|&=3\end{aligned}$$
$$\begin{aligned} 9-x&=3 \quad \text{or} \quad 9-x=-3\\ -x&=-6 \qquad\quad -x=-12\\ x&=6 \qquad\quad x=12\end{aligned}$$

11.
$$\left|\frac{2x+3}{4}\right|=2$$
$$\begin{aligned} \frac{2x+3}{4}&=2 \quad \text{or} \quad \frac{2x+3}{4}=-2\\ 2x+3&=8 \qquad\quad 2x+3=-8\\ 2x&=5 \qquad\quad x=-11\\ x&=\frac{5}{2}=2.5 \qquad\quad x=-\frac{11}{2}=-5.5\end{aligned}$$

12.
$$|5x-8|=|3x+2|$$
$$\begin{aligned} 5x-8&=3x+2 \quad \text{or} \quad 5x-8=-3x-2\\ 2x&=10 \qquad\quad 8x=6\\ x&=5 \qquad\quad x=\frac{6}{8}=0.75\end{aligned}$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

13. Let W = width, then $W + 20$ = length.
$$P = 2L + 2W$$
$$280 = 2(W + 20) + 2W$$
$$280 = 2W + 40 + 2W$$
$$280 = 4W + 40$$
$$240 = 4W$$
$$60 = W$$
$80 = W + 20$
The dimensions are 60 in. × 80 in.

14. Let n = the number of checks.
$$6 + 0.12n = 9.12$$
$$0.12n = 3.12$$
$$n = 26$$
He used 26 checks.

15. Let x = number of lb Cindi picked up.
$$x + \frac{x}{2} + 80 = 455$$
$$2x + x + 160 = 910$$
$$3x = 750$$
$$x = 250$$
$\frac{x}{2} + 80 = 205$ pounds for Alan
Cindi picked up 250 pounds and Alan picked up 205 pounds.

16. Let x = length of shortest side.
Then $2x - 5$ = length of longest side and $x + 9$ = length of third side.
$$2x - 5 + x + 9 + x = 62$$
$$4x + 4 = 62$$
$$4x = 58$$
$$x = 14.5$$
$x + 9 = 14.5 + 9 = 23.5$
$2x - 5 = 2(14.5) - 5 = 24$
The shortest side is 14.5 feet, the longest side is 24 feet, and the third side is 23.5 feet.

2.5 Exercises

2. Let x = debt in 2011.
$$x + 0.28x = 18.1$$
$$1.28x = 18.1$$
$$x \approx 14.1$$
The U.S. national debt on February 5, 2011, was approximately $14.1 trillion.

4. Let x = members in 2000.
$$x + 0.61x = 52.9$$
$$1.61x = 52.9$$
$$x \approx 32.9$$
Approximately 32.9 million Americans were health club members in 2000.

6. Let x = the number of deer carrying infected ticks.
$$0.6x = 15$$
$$x = 25$$
The total number of deer carrying infected ticks is approximately 25.

8. Let x = Judy's cost.
Then $2x - 250$ = Lynn's cost.
$$x + 2x - 250 = 950$$
$$3x = 1200$$
$$x = 400$$
$2x - 250 = 550$
Judy pays $400 and Lynn pays $550.

10. Let x = Grace's starting salary.
$1300 - x$ = Tony's starting salary.
$$2x + 3(1300 - x) = 3200$$
$$2x + 3900 - 3x = 3200$$
$$-x = -700$$
$$x = 700$$
$1300 - x = 600$
Grace earned $700 per week ten years ago.
Tony earned $600 per week ten years ago.

12. Let x = number of boxes Rockland sold.
$460 - x$ = number of boxes Harrisville sold.
$$\frac{1}{2}x + \frac{2}{5}(460 - x) = 205$$
$$5x + 4(460 - x) = 2050$$
$$5x + 1840 - 4x = 2050$$
$$x = 210$$
$460 - x = 250$
Rockland sold 210 boxes of cookies and Harrisville sold 250 boxes.

14. $I = prt = 4800(0.11)(2)$
$I = 1056$
The interest was $1056.

16. $I = prt$
$I = 4000(0.061)(0.25)$
$I = 61.00$
The interest was $61.

18. Let x = amount invested at 13%.
Then $45{,}000 - x$ = amount invested at 16%.
$$0.13x + 0.16(45{,}000 - x) = 6570$$
$$0.13x + 7200 - 0.16x = 66{,}570$$
$$-0.3x = -630$$
$$x = 21{,}000$$
$45{,}000 - x = 24{,}000$
She invested $21,000 at 13% and $24,000 at 16%.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

20. Let x = amount invested at 5%.
Then $8000 - x$ = amount invested at 7%.
$0.05x + 0.07(8000 - x) = 496$
$0.05x + 560 - 0.07x = 496$
$-0.02x = -64$
$x = 3200$
$8000 - x = 4800$
The amount invested at 5% was \$3200. The amount invested at 7% was \$4800.

22. Let x = milliliters of 16% solution.
Then $350 - x$ = milliliters of 9% solution.
$0.16x + 0.09(350 - x) = 0.12(350)$
$0.16x + 31.5 - 0.09x = 42$
$0.07x = 10.5$
$x = 150$
$350 - x = 200$
She should use 150 milliliters of the 16% solution and 200 milliliters of the 9% solution.

24. Let x = the number of pounds of \$7 per pound tea. Then $32 - x$ = the number of pounds of \$9 per pound tea.
$7x + 9(32 - x) = 8.50(32)$
$7x + 288 - 9x = 272$
$-2x = -16$
$x = 8$
$32 - x = 24$
He should use 8 pounds of the \$7/lb tea and 24 pounds of the \$9/lb tea.

26. Let x = number of oz of 90% DEET.
$10 - x$ = number of oz of 10% DEET.
$0.90x + 0.10(10 - x) = 0.3(10)$
$0.9x + 1 - 0.1x = 3$
$0.8x = 2$
$x = 2.5$
$10 - x = 10 - 2.5 = 7.5$
They need to mix 2.5 ounces of 90% DEET with 7.5 ounces of 10% DEET.

28. Let x = maximum flying speed.
Then $x - 60$ = cruising speed.
$3x + 2(x - 60) = 930$
$3x + 2x - 120 = 930$
$5x = 1050$
$x = 210$
Maximum flying speed is 210 mph.

30. Let x = time of each trip.
$14x = 6x + 20$
$8x = 20$
$x = 2.5$
Each family spent 2.5 hours or $2\frac{1}{2}$ hours.

Cumulative Review

31. $5a - 2b + c = 5(1) - 2(-3) + (-4)$
$= 5 + 6 - 4$
$= 11 - 4$
$= 7$

32. $2x^2 - 3x + 1 = 2(-2)^2 - 3(-2) + 1$
$= 2 \cdot 4 + 6 + 1$
$= 8 + 6 + 1$
$= 14 + 1$
$= 15$

33. $\dfrac{5 + 8(-2) + 2^4}{|2 - 7|} = \dfrac{5 + (-16) + 16}{|-5|} = \dfrac{5}{5} = 1$

34. $\dfrac{\sqrt{7^2 - 24}}{2^3(-1) + 7(4)} = \dfrac{\sqrt{49 - 24}}{8(-1) + 7(4)}$
$= \dfrac{\sqrt{25}}{-8 + 28}$
$= \dfrac{5}{20}$
$= \dfrac{1}{4}$

Classroom Quiz 2.5

1. Let x = price one month ago.
$x - 0.07x = 1302$
$0.93x = 1302$
$x = 1400$
The price was \$1400 a month ago.

2. Let x = amount of 45% fertilizer.
Then $120 - x$ = amount of 18% fertilizer.
$0.45x + 0.18(120 - x) = 0.36(120)$
$0.45x + 21.6 - 0.18x = 43.2$
$0.27x + 21.6 = 43.2$
$0.27x = 21.6$
$x = 80$
$120 - x = 40$
They should mix 80 gallons of the 45% fertilizer and 40 gallons of the 18% fertilizer.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

3. Let x = amount invested at 6%.
Then $6000 - x$ = amount invested at 8%.

$$0.06x + 0.08(6000 - x) = 450$$
$$0.06x + 480 - 0.08x = 450$$
$$480 - 0.02x = 450$$
$$-0.02x = -30$$
$$x = 1500$$

$6000 - x = 4500$
He invested \$1500 at 6% and \$4500 at 8%.

2.6 Exercises

2. False, adding $-5x$ to both sides of an inequality does not reverse the direction of the inequality.

4. True, the graph of $x > -2$ is the set of all points to the right of -2 on a number line.

6. False, the term -4 must also be multiplied by the LCD.

8. $-15 < 4$ because -15 is to the left of 4 on a number line.

10. $-5 > -9$ because -5 is to the right of -9 on a number line.

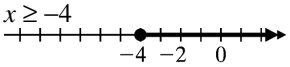
12. $\frac{5}{6} > \frac{5}{7}$ because $\frac{5}{6}$ is to the right of $\frac{5}{7}$ on a number line.

14. $-\frac{5}{12} = -0.41\overline{6} > -0.\overline{428571} = -\frac{3}{7}$

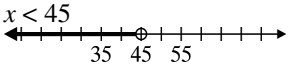
16. $-2.69 > -2.7$ because -2.69 is to the right of -2.7 on a number line.

18. $|8 - 13| = |-5| = 5$
$|-3 - 4| = |-7| = 7$
$|8 - 13| < |-3 - 4|$ since $5 < 7$.

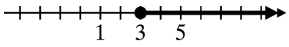
20. $x \geq -4$



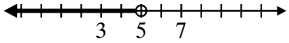
22. $x < 45$



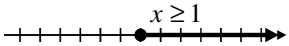
24.
$$3 + 5x \geq 18$$
$$3 - 3 + 5x \geq 15 - 3$$
$$5x \geq 15$$
$$\frac{5x}{5} \geq \frac{15}{5}$$
$$x \geq 3$$



26.
$$2x + 5 > 4x - 5$$
$$2x - 4x + 5 > 4x - 5 - 4x$$
$$-2x + 5 > -5$$
$$-2x + 5 - 5 > -5 - 5$$
$$-2x > -10$$
$$\frac{-2x}{-2} < \frac{-10}{-2}$$
$$x < 5$$



28.
$$1.7 - 0.6x \leq x + 0.1$$
$$1.7 - 0.6x - x \leq x - x + 0.1$$
$$1.7 - 1.6x \leq 0.1$$
$$1.7 - 1.7 - 1.6x \leq 0.1 - 1.7$$
$$-1.6x \leq -1.6$$
$$x \geq 1$$



30.
$$5x - 1 > 29$$
$$5x - 1 + 1 > 29 + 1$$
$$5x > 30$$
$$\frac{5x}{5} > \frac{30}{5}$$
$$x > 6$$

32.
$$8x - 7 \leq 4x - 19$$
$$8x - 4x - 7 \leq 4x - 4x - 19$$
$$4x - 7 \leq -19$$
$$4x - 7 + 7 \leq -19 + 7$$
$$4x \leq -12$$
$$\frac{4x}{4} \leq \frac{-12}{4}$$
$$x \leq -3$$

34.
$$2x + \frac{5}{2} > \frac{3}{2}x - 2$$
$$2\left(2x + \frac{5}{2}\right) > 2\left(\frac{3}{2}x - 2\right)$$
$$4x + 5 > 3x - 4$$
$$4x - 3x > -4 - 5$$
$$x > -9$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

36. $4x+7+5(x-5)<0$
$4x+7+5x-25<0$
$9x-18<0$
$9x<18$
$\frac{9x}{9}<\frac{18}{9}$
$x<2$

38. $-3(x+1)-\frac{x}{2}+\frac{3}{2}<0$
$-3x-3-\frac{x}{2}+\frac{3}{2}<0$
$2\left(-3x-3-\frac{x}{2}+\frac{3}{2}\right)<2(0)$
$-6x-6-x+3<0$
$-7x-3<0$
$-7x<3$
$\frac{-7x}{-7}>\frac{3}{-7}$
$x>-\frac{3}{7}$

40. $0.3x+1.2\geq 3.8-x$
$10(0.3x+1.2)\geq 10(3.8-x)$
$3x+12\geq 38-10x$
$3x+10x\geq 38-12$
$13x\geq 26$
$\frac{13x}{13}\geq\frac{26}{13}$
$x\geq 2$

42. $1.2-0.8x\leq 0.3(4-x)$
$1.2-0.8x\leq 1.2-0.3x$
$-0.8x+0.3x\leq 1.2-1.2$
$-0.5x\leq 0$
$\frac{-0.5x}{-0.5}\geq\frac{0}{-0.5}$
$x\geq 0$

44. $\frac{3}{4}+\frac{1}{2}(x-7)\leq 1-\frac{x}{4}$
$4\left[\frac{3}{4}+\frac{1}{2}(x-7)\right]\leq 4\left(1-\frac{x}{4}\right)$
$3+2(x-7)\leq 4-x$
$3+2x-14\leq 4-x$
$2x-11\leq 4-x$
$2x+x\leq 4+11$
$3x\leq 15$
$\frac{3x}{3}\leq\frac{15}{3}$
$x\leq 5$

46. $1-\frac{2x+1}{2}>\frac{x}{4}+\frac{4}{3}$
$12\left(1-\frac{2x+1}{2}\right)>12\left(\frac{x}{4}+\frac{4}{3}\right)$
$12-12x-6>3x+16$
$-12x+6>3x+16$
$-15x>10$
$\frac{-15x}{-15}<\frac{10}{-15}$
$x<-\frac{2}{3}$

48. Let x = number of new customers.
$(7.50)(20)+25x>600$
$150+25x>600$
$25x>450$
$\frac{25x}{25}>\frac{450}{25}$
$x>18$
She must sign up more than 18 customers.

50. Let x = the number of packages.
$180+160+68.5x\leq 2395$
$68.5x\leq 2055$
$x\leq 30$
A maximum of thirty packages can be carried.

52. Let x = the number of additional ounces per package after the first ounce.
$0.50+0.25x\leq 8.00$
$0.25x\leq 7.50$
$\frac{0.25x}{0.25}\leq\frac{7.50}{0.25}$
$x\leq 30$
A box could not weigh more than $30 + 1 = 31$ ounces.

Cumulative Review

53. $3xy(x+2)-4x^2(y-1)$
$=3x^2y+6xy-4x^2y+4x^2$
$=6xy-x^2y+4x^2$

54. $\frac{2}{3}ab(6a-2b+9)$
$=\frac{2}{3}ab(6a)-\frac{2}{3}ab(2b)+\frac{2}{3}ab(9)$
$=4a^2b-\frac{4}{3}ab^2+6ab$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

55. $\left(\dfrac{4x^2}{3yw^{-1}}\right)^3 = \dfrac{4^3x^{2\cdot3}}{3^3y^3w^{-1(3)}} = \dfrac{64x^6}{27y^3w^{-3}} = \dfrac{64x^6w^3}{27y^3}$

56. $(-3a^0b^{-3}c^5)^{-2} = (-3b^{-3}c^5)^{-2}$
$= (-3)^{-2}b^{-3(-2)}c^{5(-2)}$
$= \dfrac{1}{9}b^6c^{-10}$
$= \dfrac{b^6}{9c^{10}}$

Classroom Quiz 2.6

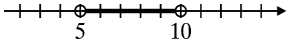
1. $9x-2>4x+8$
$9x-4x-2>4x-4x+8$
$5x-2>8$
$5x-2+2>8+2$
$5x>10$
$\dfrac{5x}{5}>\dfrac{10}{5}$
$x>2$

2. $-6(x+3)>-3x-8$
$-6x-18>-3x-8$
$-6x+3x-18>-3x+3x-8$
$-3x-18>-8$
$-3x-18+18>-8+18$
$-3x>10$
$\dfrac{-3x}{-3}<\dfrac{10}{-3}$
$x<-\dfrac{10}{3}$

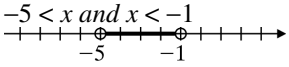
3. $\dfrac{1}{3}(x-2)\le\dfrac{1}{7}(7x-14)-2$
$21\left[\dfrac{1}{3}(x-2)\right]\le 21\left[\dfrac{1}{7}(7x-14)-2\right]$
$7(x-2)\le 3(7x-14)-42$
$7x-14\le 21x-42-42$
$7x-14\le 21x-84$
$7x-21x\le -84+14$
$-14x\le -70$
$\dfrac{-14x}{-14}\ge\dfrac{-70}{-14}$
$x\ge 5$

2.7 Exercises

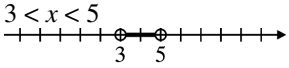
2. $5<x$ *and* $x<10$



4. $-5<x$ *and* $x<-1$



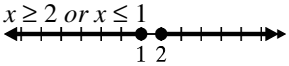
6. $3<x<5$



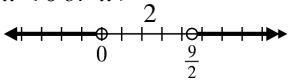
8. $-\dfrac{7}{2}\le x<2$



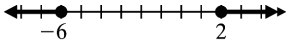
10. $x\ge 2$ *or* $x\le 1$



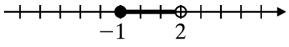
12. $x<0$ *or* $x>\dfrac{9}{2}$



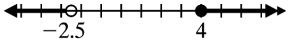
14. $x\le -6$ *or* $x\ge 2$



16. $4x-1<7$ *and* $x\ge -1$
$-1\le x$ *and* $4x-1<7$
$4x<8$
$x<2$



18. $x+1\ge 5$ *or* $x+5<2.5$
$x\ge 4$ $x<-2.5$



20. $x<6$ *and* $x>9$
These two graphs do not overlap.
No solution

22. $s<10$ *or* $s>12$

24. $490\le c\le 2000$

26. $16\le C\le 24$
$16\le\dfrac{5}{9}(F-32)\le 24$
$\dfrac{9}{5}(16)\le\dfrac{9}{5}\cdot\dfrac{5}{9}(F-32)\le\dfrac{9}{5}(24)$
$28.8\le F-32\le 43.2$
$60.8^\circ\le F\le 75.2^\circ$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

28. Carrie will need between 69,000 yen and 84,000 yen for 3 weeks.

$$69{,}000 \le Y \le 84{,}000$$
$$69{,}000 \le 119(d-5) \le 84{,}000$$
$$579.83 \le d-5 \le 705.88$$
$$\$584.83 \le d \le 710.88$$

30. $x-2<9$ *and* $x+3<6$

$x<11$ $\quad$ $x<3$

$x<3$ is the solution.

32. $5x+6\ge -9$ *and* $10-x\ge 3$

$5x\ge -15$ $\quad$ $-x\ge -7$

$x\ge -3$ $\quad$ $x\le 7$

$-3\le x\le 7$ is the solution.

34. $5x+1<1$ *or* $3x-9>9$

$5x<0$ $\quad$ $3x>18$

$x<0$ $\quad$ $x>6$

$x<0$ or $x>6$ is the solution.

36. $-0.3x-0.4\ge 0.1x$ *or* $0.2x+0.3\le -0.4x$

Multiply by 10 on both sides of both inequalities to clear decimals.

$-3x-4\ge x$ *or* $2x+3\le -4x$

$-4x\ge 4$ $\quad$ $6x\le -3$

$x\le -1$ $\quad$ $x\le -0.5$

$x\le -0.5$ contains $x\le -1$.

$x\le -0.5$ is the solution.

38. $\dfrac{5x}{3}-2<\dfrac{14}{3}$ *and* $3x+\dfrac{5}{2}<-\dfrac{1}{2}$

$5x-6<14$ $\quad$ $6x+5<-1$

$5x<20$ $\quad$ $6x<-6$

$x<4$ $\quad$ $x<-1$

$x<-1$ is the solution.

40. $6x-10<8$ *and* $2x+1>9$

$6x<18$ $\quad$ $2x>8$

$x<3$ $\quad$ $x>4$

$x<3$ *and* $x>4$ do not overlap.

No solution

42. $7x+2\ge 11x+14$ *and* $x+9\ge 6$

$-4x\ge 12$ $\quad$ $x\ge -3$

$x\le -3$

$x\le -3$ *and* $x\ge -3$ overlap at $x=-3$. $x=-3$ is the solution.

44. $\dfrac{x-4}{6}-\dfrac{x-2}{9}\le \dfrac{5}{18}$ *or* $-\dfrac{2}{5}(x+3)<-\dfrac{6}{5}$

$3x-12-2x+4\le 5$ $\quad$ $-2x-6<-6$

$x-8\le 5$ $\quad$ $-2x<0$

$x\le 13$ $\quad$ $x>0$

The solution is all real numbers.

Cumulative Review

45. $-3(x+5)+2(2x-1)=-3x-15+4x-2=x-17$

46. Radius $=r=\dfrac{d}{2}=\dfrac{6}{2}=3$ in.

Area $=\pi r^2=\pi(3)^2=9\pi\approx 9(3.14)=28.26$ in.^{2}

47. $3y-5x=8$

$-5x=8-3y$

$(-1)(-5x)=(-1)(8-3y)=-8+3y$

$5x=3y-8$

$x=\dfrac{3y-8}{5}$

48. $7x+6y=-12$

$6y=-12-7x$

$y=\dfrac{-12-7x}{6}$

Classroom Quiz 2.7

1. $2x-5<25$ *and* $2x>-6$

$2x<30$ $\quad$ $x>-3$

$x<15$

$-3<x<15$ is the solution.

2. $x>7$ *and* $3x-1<29$

$3x<30$

$x<10$

$7<x<10$ is the solution.

3. $x-2\le -20$ *or* $4x+3\ge 19$

$x\le -18$ $\quad$ $4x\ge 16$

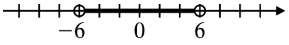
$x\ge 4$

$x\le -18$ *or* $x\ge 4$ is the solution.

2.8 Exercises

2. $|x|<6$

$-6<x<6$



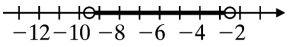
Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

4. $|x+6|<3.5$

$-3.5<x+6<3.5$

$-9.5<x<-2.5$



6. $|x-8|\le 12$

$-12\le x-8\le 12$

$-4\le x\le 20$

8. $|2x+3|\le 11$

$-11\le 2x+3\le 11$

$-14\le 2x\le 8$

$-7\le x\le 4$

10. $|2x-3|\le 1 \Leftrightarrow -1\le 2x-3\le 1$

$2\le 2x\le 4$

$1\le x\le 2$

12. $|0.6-0.3x|<9 \Leftrightarrow -9<0.6-0.3x<9$

$-9.6<-0.3x<8.4$

$32>x>-28$

$-28<x<32$

14. $\left|\frac{1}{3}x+4\right|<7$

$-7<\frac{1}{3}x+4<7$

$-21<x+12<21$

$-33<x<9$

16. $\left|\frac{3}{4}(x+1)\right|<2$

$-2<\frac{3}{4}(x+1)<2$

$-\frac{8}{3}<x+1<\frac{8}{3}$

$-\frac{11}{3}<x<\frac{5}{3}$

18. $\left|\frac{5x-3}{2}\right|<4$

$-4<\frac{5x-3}{2}<4$

$-8<5x-3<8$

$-5<5x<11$

$-1<x<\frac{11}{5}$

$-1<x<2\frac{1}{5}$

20. $|x|\ge 7$

$x\ge 7$ *or* $x\le -7$

22. $|x+4|>7$

$x+4<-7$ *or* $x+4>7$

$x<-11$ $\quad$ $x>3$

$x<-11$ *or* $x>3$

24. $|x-6|\ge 4$

$x-6\le -4$ *or* $x-6\ge 4$

$x\le 2$ $\quad$ $x\ge 10$

$x\le 2$ *or* $x\ge 10$

26. $|6x-5|\ge 7$

$6x-5\le -7$ *or* $6x-5\ge 7$

$6x\le -2$ $\quad$ $6x\ge 12$

$x\le -\frac{1}{3}$ $\quad$ $x\ge 2$

$x\le -\frac{1}{3}$ *or* $x\ge 2$

28. $|0.5-0.1x|>6$

$0.5-0.1x<-6$ *or* $0.5-0.1x>6$

$-0.1x<-6.5$ $\quad$ $-0.1x>5.5$

$x>65$ $\quad$ $x<-55$

$x<-55$ *or* $x>65$

30. $\left|\frac{1}{4}x-\frac{3}{8}\right|>1$

$\frac{1}{4}x-\frac{3}{8}<-1$ *or* $\frac{1}{4}x-\frac{3}{8}>1$

$2x-3<-8$ $\quad$ $2x-3>8$

$2x<-5$ $\quad$ $2x>11$

$x<-\frac{5}{2}$ $\quad$ $x>\frac{11}{2}$

$x<-2\frac{1}{2}$ $\quad$ $x>5\frac{1}{2}$

$x<-2\frac{1}{2}$ *or* $x>5\frac{1}{2}$

32. $\left|\frac{2}{5}(x-2)\right|\le 4$

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

$-20\le 2x-4\le 20$

$-16\le 2x\le 24$

$-8\le x\le 12$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

34. $|2x+3|<5$
$-5<2x+3<5$
$-8<2x<2$
$-4<x<1$

36. $|4-3x|>4$
$4-3x<-4$ *or* $4-3x>4$
$-3x<-8$ $\quad$ $-3x>0$
$x>\frac{8}{3}$ $\quad$ $x<0$
$x<0$ *or* $x>\frac{8}{3}$

38. $|m-s|\le 0.12$
$|m-17.48|\le 0.12$
$-0.12\le m-17.48\le 0.12$
$17.36\le m\le 17.60$

40. $|n-p|\le 0.03$
$|n-19.8|\le 0.03$
$-0.03\le n-19.8\le 0.03$
$19.77\le n\le 19.83$

Cumulative Review

41. $0.000045=4.5\times10^{-5}$

42. $|2x-1|=8$
$2x-1=8$ or $2x-1=-8$
$2x=9$ $\quad$ $2x=-7$
$x=\frac{9}{2}$ $\quad$ $x=-\frac{7}{2}$

43. $\text{distance}=2\left[\frac{1}{8}\cdot\text{circumference}\right]$
$=2\left[\frac{1}{8}(2\pi\cdot\text{radius})\right]$
$\approx 2\left[\frac{1}{3}(2\cdot3.14\cdot19)\right]$
≈ 29.83
The end of the rope travels 29.83 meters.

44. $\text{distance}=2\cdot\frac{1}{6}(2\pi\cdot30)$
$\approx 2\cdot\frac{1}{6}(2\cdot3.14\cdot30)$
≈ 62.8
The end of the wire travels 62.8 feet.

Classroom Quiz 2.8

1. $\left|\frac{1}{3}x-\frac{1}{6}\right|<2$
$-2<\frac{1}{3}x-\frac{1}{6}<2$
$6(-2)<6\left(\frac{1}{3}x-\frac{1}{6}\right)<6(2)$
$-12<2x-1<12$
$-11<2x<13$
$-\frac{11}{2}<x<\frac{13}{2}$
$-5\frac{1}{2}<x<6\frac{1}{2}$

2. $|3x+12|\le 10$
$-10\le 3x+12\le 10$
$-22\le 3x\le -2$
$-\frac{22}{3}\le x\le -\frac{2}{3}$
$-7\frac{1}{3}\le x\le -\frac{2}{3}$

3. $|4x-3|>21$
$4x-3<-21$ *or* $4x-3>21$
$4x<-18$ $\quad$ $4x>24$
$x<-\frac{18}{4}$ $\quad$ $x>6$
$x<-4\frac{1}{2}$
$x<-4\frac{1}{2}$ *or* $x>6$

Career Exploration Problems

1. Let x = liters of 60% solution used.
Then $14-x$ = liters of 25% solution.
$0.60x+0.25(14-x)=0.40(14)$
$0.6x+3.5-0.25x=5.6$
$0.35x=2.1$
$x=6$
$14-x=14-6=8$
6 liters of 60% solution should be mixed with 8 liters of 25% solution.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

2. Let x = liters of 10% solution used.
Then $15 - x$ = liters of 30% solution.

$$0.10x + 0.30(15 - x) = 0.15(15)$$
$$0.1x + 4.5 - 0.3x = 2.25$$
$$-0.2x = -2.25$$
$$x = 11.25$$

$15 - x = 15 - 11.25 = 3.75$
11.25 liters of 10% solution should be mixed with 3.75 liters of 30% solution.

3. Let x be the actual alcohol content of the solution.

$$|x - 40| \le 1.3$$
$$-1.3 \le x - 40 < 1.3$$
$$38.7 \le x \le 41.3$$

The minimum alcohol content is 38.7% and the maximum alcohol content is 41.3%.

4. Let x be the actual alcohol content of the solution.

$$|x - 15| \le 0.7$$
$$-0.7 \le x - 15 \le 0.7$$
$$14.3 \le x \le 15.7$$

The minimum alcohol content is 14.3% and the maximum alcohol content is 15.7%.

You Try It

1.
$$\frac{1}{4}(x+5) = 6 - \frac{1}{3}(2x-5)$$
$$\frac{1}{4}x + \frac{5}{4} = 6 - \frac{2}{3}x + \frac{5}{3}$$
$$12\left(\frac{1}{4}x\right) + 12\left(\frac{5}{4}\right) = 12(6) - 12\left(\frac{2}{3}x\right) + 12\left(\frac{5}{3}\right)$$
$$3x + 15 = 72 - 8x + 20$$
$$3x + 15 = 92 - 8x$$
$$11x = 77$$
$$x = 7$$

2.
$$A = \frac{h}{2}(B+b)$$
$$2A = 2\left[\frac{h}{2}(B+b)\right]$$
$$2A = h(B+b)$$
$$2A = hB + hb$$
$$2A - hB = hb$$
$$\frac{2A - hB}{h} = b$$

3. $|3x + 5| = 11$

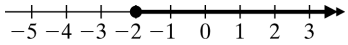
$3x + 5 = 11$ or $3x + 5 = -11$
$3x = 6$ $3x = -16$
$x = 2$ $x = -\frac{16}{3}$

4. Let x = amount invested at 6%.
Then $12{,}000 - x$ = amount invested at 9%.

$$0.06x + 0.09(12{,}000 - x) = 960$$
$$0.06x + 1080 - 0.09x = 960$$
$$1080 - 0.03x = 960$$
$$-0.03x = -120$$
$$x = 4000$$

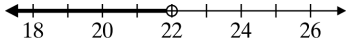
$12{,}000 - x = 8000$
Therefore, \$4000 was invested at 6% and \$8000 at 9%.

5. a.
$$8 - 2(3x+1) \le 18$$
$$8 - 6x - 2 \le 18$$
$$-6x + 6 \le 18$$
$$-6x \le 12$$
$$\frac{-6x}{-6} \ge \frac{12}{-6}$$
$$x \ge -2$$



$x \ge -2$

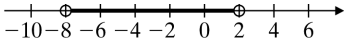
b.
$$\frac{1}{2}(x-6) < \frac{2}{5}(x-2)$$
$$\frac{1}{2}x - 3 < \frac{2}{5}x - \frac{4}{5}$$
$$5x - 30 < 4x - 8$$
$$x - 30 < -8$$
$$x < 22$$



$x < 22$

6. $x + 7 > -1$ *and* $3x + 4 < 10$

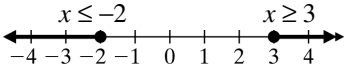
$x > -8$ $3x < 6$
$x < 2$



$x > -8$ *and* $x < 2$

7. $5x + 2 \le -8$ *or* $4x - 3 \ge 9$

$5x \le -10$ $4x \ge 12$
$x \le -2$ $x \ge 3$



$x \le -2$ *or* $x \ge 3$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

8. $|2x+7|<17$

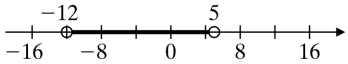
$-17<2x+7<17$

$-17-7<2x+7-7<17-7$

$-24<2x<10$

$\frac{-24}{2}<\frac{2x}{2}<\frac{10}{2}$

$-12<x<5$



$-12<x<5$

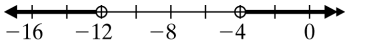
9. $\left|\frac{1}{4}(x+8)\right|>1$

$\frac{1}{4}(x+8)<-1 \quad or \quad \frac{1}{4}(x+8)>1$

$\frac{1}{4}x+2<-1 \qquad \frac{1}{4}x+2>1$

$x+8<-4 \qquad x+8>4$

$x<-12 \qquad x>-4$



$x<-12$ *or* $x>-4$

Chapter 2 Review Problems

1. $7x-3=-5x-18$

$7x+5x-3=-5x+5x-18$

$12x-3=-18$

$12x-3+3=-18+3$

$12x=-15$

$\frac{12x}{12}=\frac{-15}{12}$

$x=-\frac{5}{4}$ or -1.25 or $-1\frac{1}{4}$

2. $8-2(x+3)=24-(x-6)$

$8-2x-6=24-x+6$

$2-2x=30-x$

$-2x+x=30-2$

$-x=28$

$x=-28$

3. $5(x-2)+4=x+9-2x$

$5x-10+4=-x+9$

$5x-6=-x+9$

$5x+x-6=-x+x+9$

$6x-6=9$

$6x-6+6=9+6$

$6x=15$

$\frac{6x}{6}=\frac{15}{6}$

$x=\frac{5}{2}$ or $2\frac{1}{2}$ or 2.5

4. $x-\frac{4}{3}=\frac{11}{12}+\frac{3}{4}x$

$12\left(x-\frac{4}{3}\right)=12\left(\frac{11}{12}+\frac{3}{4}x\right)$

$12x-16=11+9x$

$12x-9x=11+16$

$3x=27$

$x=9$

5. $\frac{1}{9}x-1=\frac{1}{2}\left(x+\frac{1}{3}\right)$

$18\left(\frac{1}{9}x-1\right)=18\left[\frac{1}{2}\left(x+\frac{1}{3}\right)\right]$

$2x-18=9x+3$

$2x-9x=3+18$

$-7x=21$

$x=-3$

6. $5x=3(1.6x-4.2)$

$5x=4.8x-12.6$

$0.2x=-12.6$

$x=-63$

7. $P=\frac{1}{2}ab$

$2P=ab$

$\frac{2P}{b}=\frac{ab}{b}$

$\frac{2P}{b}=a$ or $a=\frac{2P}{b}$

8. $2(3ax-2y)-6ax=-3(ax+2y)$

$6ax-4y-6ax=-3ax-6y$

$-4y=-3ax-6y$

$2y=-3ax$

$3ax=-2y$

$a=-\frac{2y}{3x}$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

9. a.
$$C = \frac{5F - 160}{9}$$
$$9C = 5F - 160$$
$$5F - 160 = 9C$$
$$5F = 9C + 160$$
$$F = \frac{9C + 160}{5}$$

b. $F = \frac{9(10) + 160}{5} = \frac{250}{5} = 50$
$F = 50°$ when $C = 10°$.

10. a.
$$P = 2W + 2L$$
$$P - 2L = 2W$$
$$2W = P - 2L$$
$$W = \frac{P - 2L}{2}$$

b.
$$W = \frac{100 - 2(20.5)}{2}$$
$$= \frac{100 - 41}{2}$$
$$= \frac{59}{2}$$
$$= 29.5$$
$W = 29.5$ meters

11. $|2x - 7| = 9$
$2x - 7 = 9$ or $2x - 7 = -9$
$2x = 16$ $2x = -2$
$x = 8$ $x = -1$

12. $|5x + 2| = 7$
$5x + 2 = 7$ or $5x + 2 = -7$
$5x = 5$ $5x = -9$
$x = 1$ $x = -\frac{9}{5}$

13. $|3 - x| = |5 - 2x|$
$3 - x = 5 - 2x$ or $3 - x = -(5 - 2x)$
$x = 2$ $3 - x = -5 + 2x$
$-3x = -8$
$x = \frac{8}{3}$

14. $|x + 8| = |2x - 4|$
$x + 8 = 2x - 4$ or $x + 8 = -2x + 4$
$-x = -12$ $3x = -4$
$x = 12$ $x = -\frac{4}{3}$

15. $\left|\frac{1}{4}x - 3\right| = 8$
$\frac{1}{4}x - 3 = 8$ or $\frac{1}{4}x - 3 = -8$
$x - 12 = 32$ $x - 12 = -32$
$x = 44$ $x = -20$

16. $|2x - 8| + 7 = 12$
$|2x - 8| = 5$
$2x - 8 = 5$ or $2x - 8 = -5$
$2x = 13$ $2x = 3$
$x = \frac{13}{2}$ $x = \frac{3}{2}$

17.
$P = 2L + 2W$
$42 = 2(2W + 3) + 2W$
$21 = 2W + 3 + W$
$3W = 18$
$W = 6$
$2W + 3 = 15$
The width is 6 feet and the length is 15 feet.

18. Let x = the number of women.
Then $2x - 200$ = the number of men.
$2x - 200 + x = 280$
$3x - 200 = 280$
$3x = 480$
$x = 160$
$2x - 200 = 120$
There are 160 women and 120 men attending Western Tech.

19. Let x = miles she drove.
$3(38) + 0.15x = 150$
$114 + 0.15x = 150$
$0.15x = 36$
$x = 240$
She drove 240 miles.

20. Let x = the amount withheld for retirement.
Then $x + 13$ = the amount withheld for state tax, and $3(x + 13)$ = the amount withheld for federal tax.
$x + x + 13 + 3(x + 13) = 102$
$2x + 13 + 3x + 39 = 102$
$5x + 52 = 102$
$5x = 50$
$x = 10$
$x + 13 = 23$
$3(x + 13) = 69$
$10 is withheld for retirement, $23 for state tax, and $69 for federal tax.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

21. Let x = the number of tickets Nicholas sold.
Then $2x - 5$ = the number of tickets Emma sold, and $2x + 10$ = the number of tickets Jackson sold.

$$x + 2x - 5 + 2x + 10 = 180$$
$$5x = 175$$
$$x = 35$$

$2x - 5 = 65$
$2x + 10 = 80$
Nicholas sold 35 tickets, Emma sold 65 tickets, and Jackson sold 80 tickets.

22. Let x = the number of students enrolled five years ago.

$$x + 0.15x = 2415$$
$$1.15x = 2415$$
$$x = 2100$$

2100 students were enrolled five years ago.

23. Let x = amount invested at 11%.
Then $9000 - x$ = the amount invested at 6%.

$$0.11x + 0.06(9000 - x) = 815$$
$$0.11x + 540 - 0.06x = 815$$
$$540 + 0.05x = 815$$
$$0.05x = 275$$
$$x = 5500$$

$9000 - x = 3500$
He invested \$5500 at 11% and \$3500 at 6%.

24. Let x = the number of liters of 2% acid.
Then $24 - x$ = the number of liters of 5% acid.

$$0.02x + 0.05(24 - x) = 0.04(24)$$
$$0.02x + 1.2 - 0.05x = 0.96$$
$$-0.03x = -0.24$$
$$x = 8$$

$24 - x = 16$
He should use 8 liters of the 2% acid and 16 liters of the 5% acid.

25. Let x = the number of pounds of the \$4.25 a pound coffee.
Then $30 - x$ = the number of pounds of the \$4.50 a pound coffee.

$$4.25x + 4.50(30 - x) = 4.40(30)$$
$$4.25x + 135 - 4.5x = 132$$
$$-0.25x = -3$$
$$x = 12$$

$30 - x = 18$
12 pounds of \$4.25 and 18 pounds of \$4.50 should be used.

26. Let x = current full-time students.

$$\frac{1}{2}x + \frac{1}{3}(890 - x) = 380$$
$$3x + 1780 - 2x = 2280$$
$$x = 500$$

$890 - 500 = 390$
The present number of students is 500 full-time and 390 part-time.

27.
$$7x + 8 < 5x$$
$$2x < -8$$
$$\frac{2x}{2} < \frac{-8}{2}$$
$$x < -4$$

28.
$$9x + 3 < 12x$$
$$-3x < -3$$
$$\frac{-3x}{-3} > \frac{-3}{-3}$$
$$x > 1$$

29.
$$3(3x - 2) \le 4x - 16$$
$$9x - 6 \le 4x - 16$$
$$9x - 4x \le -16 + 6$$
$$5x \le -10$$
$$\frac{5x}{5} \le \frac{-10}{5}$$
$$x \le -2$$

30.
$$\frac{5}{3} - x \ge -\frac{1}{6}x + \frac{5}{6}$$
$$6\left(\frac{5}{3} - x\right) \ge 6\left(-\frac{1}{6}x + \frac{5}{6}\right)$$
$$10 - 6x \ge -x + 5$$
$$-6x + x \ge 5 - 10$$
$$-5x \ge -5$$
$$\frac{-5x}{-5} \le \frac{-5}{-5}$$
$$x \le 1$$

31.
$$\frac{1}{3}(x - 2) < \frac{1}{4}(x + 5) - \frac{5}{3}$$
$$12\left[\frac{1}{3}(x - 2)\right] < 12\left[\frac{1}{4}(x + 5) - \frac{5}{3}\right]$$
$$4(x - 2) < 3(x + 5) - 20$$
$$4x - 8 < 3x + 15 - 20$$
$$4x - 8 < 3x - 5$$
$$4x - 3x < -5 + 8$$
$$x < 3$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

32. $\frac{1}{3}(x+2) > 3x-5(x-2)$

$3\left[\frac{1}{3}(x+2)\right] > 3[3x-5(x-2)]$

$x+2 > 9x-15(x-2)$

$x+2 > 9x-15x+30$

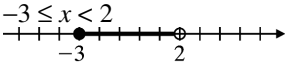
$x+2 > -6x+30$

$x+6x > 30-2$

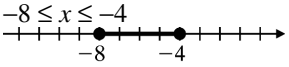
$7x > 28$

$x > 4$

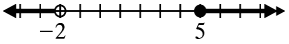
33. $-3 \le x < 2$



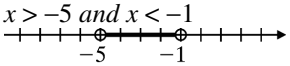
34. $-8 \le x \le -4$



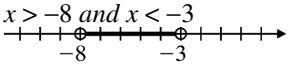
35. $x < -2$ *or* $x \ge 5$



36. $x > -5$ *and* $x < -1$

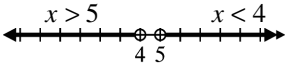


37. $x > -8$ *and* $x < -3$



38. $x+3 > 8$ *or* $x+2 < 6$

$x > 5$ $\quad$ $x < 4$



39. $x-2 > 7$ *or* $x+3 < 2$

$x > 9$ $\quad$ $x < -1$

40. $x+3 > 8$ *and* $x-4 < -2$

$x > 5$ $\quad$ $x < 2$

Since x cannot be both > 5 and < 2, there is no solution.

41. $-1 < x+5 < 8$

$-6 < x < 3$

42. $0 \le 5-3x \le 17$

$-5 \le -3x \le 12$

$\frac{5}{3} \ge x \ge -4$

$-4 \le x \le \frac{5}{3}$

$-4 \le x \le 1\frac{2}{3}$

43. $2x-7 < 3$ *and* $5x-1 \ge 8$

$2x < 10$ $\quad$ $5x \ge 9$

$x < 5$ $\quad$ $x \ge \frac{9}{5}$

$\frac{9}{5} \le x < 5$

$1\frac{4}{5} \le x < 5$

44. $4x-2 < 8$ *or* $3x+1 > 4$

$4x < 10$ $\quad$ $3x > 3$

$x < \frac{5}{2}$ $\quad$ $x > 1$

The solution is all real numbers.

45. $|x+7| < 15$

$-15 < x+7 < 15$

$-22 < x < 8$

46. $|x+9| < 18$

$-18 < x+9 < 18$

$-27 < x < 9$

47. $\left|\frac{1}{2}x+2\right| < \frac{7}{4}$

$-\frac{7}{4} < \frac{1}{2}x+2 < \frac{7}{4}$

$-7 < 2x+8 < 7$

$-15 < 2x < -1$

$-\frac{15}{2} < x < -\frac{1}{2}$

$-7\frac{1}{2} < x < -\frac{1}{2}$

48. $|2x-1| \ge 9$

$2x-1 \le -9$ *or* $2x-1 \ge 9$

$2x \le -8$ $\quad$ $2x \ge 10$

$x \le -4$ $\quad$ $x \ge 5$

49. $|3x-1| \ge 2$

$3x-1 \le -2$ *or* $3x-1 \ge 2$

$3x \le -1$ $\quad$ $3x \ge 3$

$x \le -\frac{1}{3}$ $\quad$ $x \ge 1$

50. $|2(x-5)| \ge 2$

$2(x-5) \le -2$ *or* $2(x-5) \ge 2$

$2x-10 \le -2$ $\quad$ $2x-10 \ge 2$

$2x \le 8$ $\quad$ $2x \ge 12$

$x \le 4$ $\quad$ $x \ge 6$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

51. Let x = the number of minutes he talks.

$$3.95 + 0.65(x-1) \le 13.05$$
$$3.95 + 0.65x - 0.65 \le 13.05$$
$$0.65x \le 9.75$$
$$x \le 15$$

He can talk for a maximum of 15 minutes.

52. Let x = the number of packages.

$$170 + 200 + 77.5x \le 1765$$
$$77.5x \le 1395$$
$$x \le 18$$

A maximum of eighteen packages can be carried.

53. Let x = number of cubic yards.

$$40 + 28x \le 250$$
$$28x \le 210$$
$$x \le 7.5$$

He can order a maximum of 7 cubic yards.

54. $1.04(2,312,000) \le x \le 1.06(2,854,000)$

$$2,404,480 \le x \le 3,025,240$$

55.
$$4 - 7x = 3(x+3)$$
$$4 - 7x = 3x + 9$$
$$-7x - 3x = 9 - 4$$
$$-10x = 5$$
$$\frac{-10x}{-10} = \frac{5}{-10}$$
$$x = -\frac{1}{2} \text{ or } -0.5$$

56.
$$H = \frac{3}{4}B - 16$$
$$\frac{3}{4}B = H + 16$$
$$B = \frac{4}{3}(H+16)$$
$$B = \frac{4H+64}{3}$$

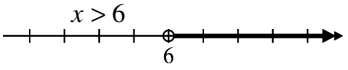
57. Let x = number of grams of 77% copper.

Then $100 - x$ = number of grams of 92% copper.

$$0.77x + 0.92(100-x) = 0.80(100)$$
$$0.77x + 92 - 0.92x = 80$$
$$-0.15x = -12$$
$$x = 80$$
$$100 - x = 20$$

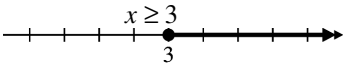
She should use 80 grams of 77% copper and 20 grams of 92% copper.

58.
$$7x + 12 < 9x$$
$$-2x < -12$$
$$x > 6$$



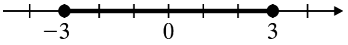
$x > 6$

59.
$$\frac{2}{3}x - \frac{5}{6}x - 3 \le \frac{1}{2}x - 5$$
$$4x - 5x - 18 \le 3x - 30$$
$$-x - 18 \le 3x - 30$$
$$-4x \le -12$$
$$x \ge 3$$

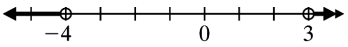


$x \ge 3$

60.
$$-2 \le x + 1 \le 4$$
$$-3 \le x \le 3$$



61.
$$2x + 3 < -5 \quad or \quad x - 2 > 1$$
$$2x < -8 \qquad\qquad x > 3$$
$$x < -4$$



62.
$$|2x - 7| + 4 = 5$$
$$|2x - 7| = 1$$
$$2x - 7 = -1 \quad \text{or} \quad 2x - 7 = 1$$
$$2x = 6 \qquad\qquad 2x = 8$$
$$x = 3 \qquad\qquad x = 4$$

63.
$$\left|\frac{2}{3}x - \frac{1}{2}\right| \le 3$$
$$-3 \le \frac{2}{3}x - \frac{1}{2} \le 3$$
$$-18 \le 4x - 3 \le 18$$
$$-15 \le 4x \le 21$$
$$-\frac{15}{4} \le x \le \frac{21}{4}$$

64.
$$|2 - 5x - 4| > 13$$
$$2 - 5x - 4 > 13 \quad or \quad 2 - 5x - 4 < -13$$
$$-5x > 15 \qquad\qquad -5x < -11$$
$$x < -3 \qquad\qquad x > \frac{11}{5}$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

How Am I Doing? Chapter 2 Test

1. $5x-8=-6x-10$
$5x+6x-8=-6x+6x-10$
$11x-8=-10$
$11x-8+8=-10+8$
$11x=-2$
$\frac{11x}{11}=\frac{-2}{11}$
$x=-\frac{2}{11}$

2. $3(7-2x)=14-8(x-1)$
$21-6x=14-8x+8$
$21-6x=22-8x$
$21-6x+8x=22-8x+8x$
$21+2x=22$
$21-21+2x=22-21$
$2x=1$
$x=\frac{1}{2}$ or 0.5

3. $\frac{1}{3}(-x+1)+4=4(3x-2)$
$3\left[\frac{1}{3}(-x+1)+4\right]=3[4(3x-2)]$
$1(-x+1)+12=12(3x-2)$
$-x+1+12=36x-24$
$-x+13=36x-24$
$-x-36x=-24-13$
$-37x=-37$
$x=1$

4. $0.5x+1.2=4x-3.05$
$100(0.5x+1.2)=100(4x-3.05)$
$50x+120=400x-305$
$120+305=400x-50x$
$425=350x \Rightarrow 350x=425$
$x=\frac{425}{350}=\frac{17(25)}{14(25)}=\frac{17}{14}$
$x=\frac{17}{14}$ or $1\frac{3}{14}$

5. $L=a+d(n-1)$
$L=a+dn-d$
$L-a+d=dn$
$n=\frac{L-a+d}{d}$

6. $A=\frac{1}{2}bh$
$2A=bh$
$bh=2A$
$b=\frac{2A}{h}$

7. $b=\frac{2A}{h}$
$b=\frac{2(15)\text{ cm}^2}{10\text{ cm}}$
$b=3$ cm

8. $H=\frac{1}{2}r+3b-\frac{1}{4}$
$4H=2r+12b-1$
$2r=4H-12b+1$
$r=\frac{4H-12b+1}{2}$

9. $|5x-2|=37$
$5x-2=37$ or $5x-2=-37$
$5x=39$ $5x=-35$
$x=\frac{39}{5}$ $x=-7$

10. $\left|\frac{1}{2}x+3\right|-2=4$
$\left|\frac{1}{2}x+3\right|=6$
$\frac{1}{2}x+3=6$ or $\frac{1}{2}x+3=-6$
$x+6=12$ $x+6=-12$
$x=6$ $x=-18$

11. Let x = the length of first side.
Then $2x$ = the length of the second side,
and $x+5$ = the length of the third side.
$x+2x+x+5=69$
$4x=64$
$x=16$
$2x=32$
$x+5=21$
The first side is 16 meters, the second side is 32 meters, and the third side is 21 meters.

12. Let x = electric bill for August.
$x-0.05x=2489$
$0.95x=2489$
$x=2620$
The electric bill for August was $2620.

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual

13. Let x = gallons of 50% antifreeze.
Then $10 - x$ = gallons of 90% antifreeze.

$$0.50x + 0.90(10 - x) = 0.60(10)$$
$$0.5x + 9 - 0.9x = 6$$
$$-0.4x = -3$$
$$x = 7.5$$

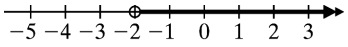
$10 - 7.5 = 2.5$
She should use 2.5 gallons of 90% and 7.5 gallons of 50%.

14. Let x = amount invested at 6%.
Then $5000 - x$ = amount invested at 10%.

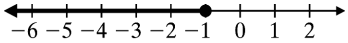
$$0.06x + 0.10(5000 - x) = 428$$
$$0.06x + 500 - 0.1x = 428$$
$$-0.04x = -72$$
$$x = 1800$$

$5000 - x = 3200$
\$1800 was invested at 6% and \$3200 was invested at 10%.

15.
$$5 - 6x < 2x + 21$$
$$-8x < 16$$
$$\frac{-8x}{-8} > \frac{16}{-8}$$
$$x > -2$$



16.
$$-\frac{1}{2} + \frac{1}{3}(2 - 3x) \geq \frac{1}{2}x + \frac{5}{3}$$
$$6\left[-\frac{1}{2} + \frac{1}{3}(2 - 3x)\right] \geq 6\left(\frac{1}{2}x + \frac{5}{3}\right)$$
$$-3 + 4 - 6x \geq 3x + 10$$
$$1 - 6x \geq 3x + 10$$
$$-6x - 3x \geq 10 - 1$$
$$-9x \geq 9$$
$$\frac{-9x}{-9} \leq \frac{9}{-9}$$
$$x \leq -1$$



17.
$$-11 < 2x - 1 \leq -3$$
$$-10 < 2x \leq -2$$
$$-5 < x \leq -1$$

18.
$$x - 4 \leq -6 \quad \textit{or} \quad 2x + 1 \geq 3$$
$$x \leq -2 \qquad\qquad 2x \geq 2$$
$$x \geq 1$$

19.
$$|7x - 3| \leq 18$$
$$-18 \leq 7x - 3 \leq 18$$
$$-15 \leq 7x \leq 21$$
$$-\frac{15}{7} \leq x \leq 3$$

20.
$$|3x + 1| > 7$$
$$3x + 1 < -7 \quad \textit{or} \quad 3x + 1 > 7$$
$$3x < -8 \qquad\qquad 3x > 6$$
$$x < -\frac{8}{3} \qquad\qquad x > 2$$

Copyright © 2017 Pearson Education, Inc.

Intermediate Algebra 8th edition Tobey Solutions Manual