24. $-4\frac{1}{2}x + 8^0 = 4^3$

$-4\frac{1}{2}x + 1 - 1 = 64 - 1$

$-4\frac{1}{2}x = 63$

$\left(-\frac{2}{9}\right)\left(-\frac{9}{2}x\right) = \left(-\frac{2}{9}\right)63$

$x = \mathbf{-14}$

25. $\frac{15}{w} = \frac{45}{3.3}$

$(45)w = 15(3.3)$

$\frac{45w}{45} = \frac{49.5}{45}$

$w = \mathbf{1.1}$

26. $\sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = \mathbf{10}$

27. $3\frac{1}{3}\left(7\frac{2}{10} \div \frac{3}{5}\right) = 3\frac{1}{3}\left(\frac{\overset{12}{\cancel{24}}}{\underset{1}{\cancel{10}}} \times \frac{\overset{1}{\cancel{5}}}{\underset{1}{\cancel{3}}}\right)$

$= 3\frac{1}{3}(12) = \frac{10}{\underset{1}{\cancel{3}}}(\overset{4}{\cancel{12}}) = \mathbf{40}$

28. $8\frac{5}{6} - 2\frac{1}{2} - 1\frac{1}{3}$

$= 8\frac{5}{6} - 2\frac{3}{6} - 1\frac{2}{6} = 6\frac{2}{6} - 1\frac{2}{6}$

$= \mathbf{5}$

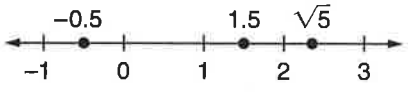
29. $\frac{|-18| - (2)(-3)}{(-3) + (-2) - (-4)}$

$\frac{18 - (-6)}{(-5) - (-4)}$

$\frac{24}{-1}$

$\mathbf{-24}$

30.



LESSON 101, LESSON PRACTICE

a. $3x + 6 = \mathbf{30}$

$3x = 24$

$x = \frac{24}{3}$

$x = \mathbf{8}$

b. $\frac{1}{2}x - 10 = \mathbf{30}$

$\frac{1}{2}x = 40$

$\left(\frac{2}{1}\right)\left(\frac{1}{2}x\right) = \left(\frac{2}{1}\right)40$

$x = \mathbf{80}$

c. $3x + 2x = \mathbf{90°}$

$5x = 90°$

$x = \frac{90°}{5}$

$x = 18°$

$2(18°) = \mathbf{36°}$

d. $x + 2x + 3x = \mathbf{180°}$

$6x = 180°$

$x = \frac{180°}{6}$

$x = \mathbf{30°}$

$2x = 2(30°) = \mathbf{60°}$

$3x = 3(30°) = \mathbf{90°}$

LESSON 101, MIXED PRACTICE

1. (a) **11.9**

(b) **11.8 and 11.9**

(c) **0.7**

2. $\$6(3.75) = \mathbf{\$22.50}$

3.

	Case 1	Case 2
Flour	3	15
Eggs	2	e

$\frac{3}{2} = \frac{15}{e}$

$3e = 30$

$e = \mathbf{10\ eggs}$

4.

	Case 1	Case 2
Words	48	w
Seconds	60	90

$\frac{48}{60} = \frac{w}{90}$

$60w = 4320$

$w = \mathbf{72\ words}$

5.

	Percent	Actual Count
Scored 100 percent	40	10
Did not score 100 percent	60	N
Total	100	T

$$\frac{40}{100} = \frac{10}{T}$$
$$40T = 1000$$
$$T = \textbf{25 students}$$

6.

	Percent	Actual Count
Original	100	\$24
− Change	40	C
New	60	N

$$\frac{100}{60} = \frac{\$24}{N}$$
$$100N = \$1440$$
$$N = \textbf{\$14.40}$$

7. $3(x - 4) - x$
$3x - 12 - x$
$3x - x - 12$
$\mathbf{2x - 12}$

8. $3 \cancel{\text{gallons}} \cdot \frac{4 \cancel{\text{quarts}}}{1 \cancel{\text{gallon}}} \cdot \frac{2 \text{ pints}}{1 \cancel{\text{quart}}} = \textbf{24 pints}$

9.

24 games	
$\frac{5}{6}$ won (20).	4 games
	4 games
	4 games
	4 games
	4 games
$\frac{1}{6}$ lost.	4 games

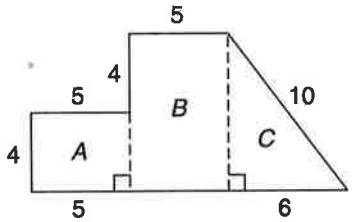
(a) $20 \div 5 = 4$, $6(4 \text{ games}) = \textbf{24 games}$

(b) $\frac{\text{won}}{\text{lost}} = \frac{20}{4} = \frac{\mathbf{5}}{\mathbf{1}}$

10. **14 and 15**

11. $w \textcircled{<} m$

12.



Area A = $(4 \text{ cm})(5 \text{ cm})$ = 20 cm^2
Area B = $(5 \text{ cm})(8 \text{ cm})$ = 40 cm^2
+ Area C = $\frac{(6 \text{ cm})(8 \text{ cm})}{2}$ = 24 cm^2
Area of figure = $\textbf{84 cm}^2$

13. $6n - 3 = 45$
$6n = 48$
$n = \mathbf{8}$

14. $(8 \times 4) \times (10^8 \times 10^{-2}) = 32 \times 10^6$
$= \mathbf{3.2 \times 10^7}$

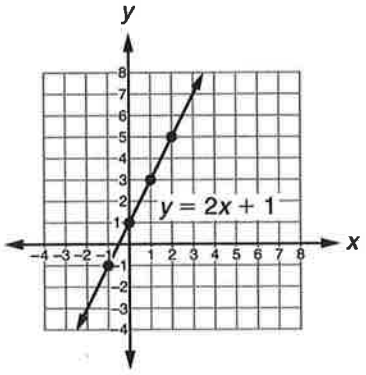
15. (a) $\frac{\mathbf{1}}{\mathbf{50}}$

(b) **2%**

(c) $\frac{\mathbf{1}}{\mathbf{500}}$

(d) **0.002**

16. $y = 2(-1) + 1$
$y = -2 + 1$
$y = \mathbf{-1;}$
$y = 2(0) + 1$
$y = 0 + 1$
$y = \mathbf{1;}$
$y = 2(1) + 1$
$y = 2 + 1$
$y = \mathbf{3;}$
$y = 2(2) + 1$
$y = 4 + 1$
$y = \mathbf{5}$



17. (a) Area of base = $(4 \text{ in.})(4 \text{ in.})$ = 16 in.^2
Volume = $(16 \text{ in.}^2)(4 \text{ in.})$ = $\textbf{64 in.}^3$

(b) Surface area = $6(16 \text{ in.}^2)$ = $\textbf{96 in.}^2$

18. (a) $C = \pi(18 \text{ cm})$
$C = \mathbf{18\pi \text{ cm}}$

(b) $A = \pi(81 \text{ cm}^2)$
$A = \mathbf{81\pi \text{ cm}^2}$

19. **1 to 1**

20.
$$\begin{aligned} 2x + x &= 90^\circ \\ 3x &= 90^\circ \\ x &= \frac{90^\circ}{3} \\ x &= \mathbf{30^\circ} \end{aligned}$$
$$2x = 2(30^\circ) = \mathbf{60^\circ}$$

21. (a) $9\overline{)1.2300}$ $\quad$ **$0.1366\ldots = 0.13\overline{6}$**

$$\begin{array}{r} 0.1366\ldots \\ 9\overline{)1.2300} \\ \underline{9} \\ 33 \\ \underline{27} \\ 60 \\ \underline{54} \\ 60 \\ \underline{54} \\ 6 \end{array}$$

(b) 0.1366 . . . rounded to three decimal places is **0.137**

22.
$$\begin{aligned} (AB)^2 &= (9\text{ cm})^2 + (12\text{ cm})^2 \\ (AB)^2 &= 81\text{ cm}^2 + 144\text{ cm}^2 \\ (AB)^2 &= 225\text{ cm}^2 \\ AB &= \mathbf{15\text{ cm}} \end{aligned}$$

23. (a)
$$\begin{aligned} \text{Perimeter} &= 2(9\text{ cm}) + 2(12\text{ cm}) \\ &\quad + 2(15\text{ cm}) \\ &= 18\text{ cm} + 24\text{ cm} + 30\text{ cm} \\ &= \mathbf{72\text{ cm}} \end{aligned}$$

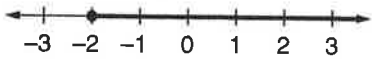
(b) $\text{Area} = \dfrac{(18\text{ cm})(24\text{ cm})}{2} = \mathbf{216\text{ cm}^2}$

24. $p(B, B) = \dfrac{4}{10} \cdot \dfrac{3}{9} = \dfrac{12}{90} = \mathbf{\dfrac{2}{15}}$

25.
$$3\tfrac{1}{7}d = 88$$
$$\left(\frac{7}{22}\right)\frac{22}{7}d = \left(\frac{7}{22}\right)88$$
$$d = \mathbf{28}$$

26.
$$\begin{aligned} 3x + 20 &\geq 14 \\ 3x + 20 - 20 &\geq 14 - 20 \\ 3x &\geq -6 \\ \frac{3x}{3} &\geq \frac{-6}{3} \\ x &\geq \mathbf{-2} \end{aligned}$$

$x \geq -2$



27.
$$\begin{aligned} &5^2 + (3^3 - \sqrt{81}) \\ &= 25 + (27 - 9) = 25 + 18 = \mathbf{43} \end{aligned}$$

28.
$$\begin{aligned} &3x + 2(x - 1) \\ &3x + 2x - 2 \\ &\mathbf{5x - 2} \end{aligned}$$

29.
$$\left(4\tfrac{4}{9}\right)\left(2\tfrac{7}{10}\right)\left(1\tfrac{1}{3}\right) = \frac{\cancel{40}^{4}}{\cancel{9}_{1}} \cdot \frac{\cancel{27}^{\cancel{3}^{1}}}{\cancel{10}_{1}} \cdot \frac{4}{\cancel{3}_{1}} = \mathbf{16}$$

30.
$$\begin{aligned} &(-2)(-3) - (-4)(-5) \\ &(6) - (20) \\ &\mathbf{-14} \end{aligned}$$

LESSON 102, LESSON PRACTICE

a. $\angle s$ and $\angle u$, $\angle t$ and $\angle v$, $\angle w$ and $\angle y$, $\angle x$ and $\angle z$

b. $\angle t$ and $\angle y$, $\angle x$ and $\angle u$

c. $\angle s$ and $\angle z$, $\angle w$ and $\angle v$

d. $\mathbf{m\angle t = m\angle v = m\angle y = 80^\circ}$
$\mathbf{m\angle s = m\angle u = m\angle x = m\angle z = 100^\circ}$

e.
$$\begin{aligned} 3w - 10 + w &= 90 \\ 4w - 10 &= 90 \\ 4w - 10 + 10 &= 90 + 10 \\ 4w &= 100 \\ w &= \frac{100}{4} \\ w &= \mathbf{25} \end{aligned}$$

f.
$$\begin{aligned} x + x + 10 + 2x - 10 &= 180 \\ 4x + 10 - 10 &= 180 \\ 4x &= 180 \\ x &= \frac{180}{4} \\ x &= \mathbf{45} \end{aligned}$$

g.
$$\begin{aligned} 3y + 5 &= y - 25 \\ 3y + 5 - y &= y - 25 - y \\ 2y + 5 &= -25 \\ 2y + 5 - 5 &= -25 - 5 \\ 2y &= -30 \\ y &= \frac{-30}{2} \\ y &= \mathbf{-15} \end{aligned}$$

h.
$$\begin{aligned} 4n - 5 &= 2n + 3 \\ 4n - 5 - 2n &= 2n + 3 - 2n \\ 2n - 5 &= 3 \\ 2n - 5 + 5 &= 3 + 5 \\ 2n &= 8 \\ n &= \frac{8}{2} \\ n &= \mathbf{4} \end{aligned}$$

i.
$$\begin{aligned} 3x - 2(x - 4) &= 32 \\ 3x - 2x + 8 &= 32 \\ x + 8 &= 32 \\ x + 8 - 8 &= 32 - 8 \\ x &= \mathbf{24} \end{aligned}$$

j.
$$\begin{aligned} 3x &= 2(x - 4) \\ 3x &= 2x - 8 \\ 3x - 2x &= 2x - 8 - 2x \\ x &= \mathbf{-8} \end{aligned}$$

Lesson 102, Mixed Practice

1. (a)
$$p(1,4) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$
$$p(4,1) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$
$$p(2,3) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$
$$p(3,2) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$$
$$\frac{1}{36} + \frac{1}{36} + \frac{1}{36} + \frac{1}{36} = \frac{\mathbf{4}}{\mathbf{36}} = \frac{\mathbf{1}}{\mathbf{9}}$$

(b) **8 to 1**

2.
$$\begin{aligned} \mathbf{3x - 12 = 36} \\ 3x - 12 + 12 &= 36 + 12 \\ 3x &= 48 \\ x &= \frac{48}{3} \\ x &= \mathbf{16} \end{aligned}$$

3. (a) $\frac{360°}{10} = \mathbf{36°}$

(b) $180° - 36° = \mathbf{144°}$

4.

	Ratio	Actual Count
Youths	3	Y
Adults	7	A
Total	10	4500

$$\begin{aligned} \frac{7}{10} &= \frac{A}{4500} \\ 10A &= 31{,}500 \\ A &= \mathbf{3150\ adults} \end{aligned}$$

5.

	Case 1	Case 2
Over	2	8
Up	1	u

$$\begin{aligned} \frac{2}{1} &= \frac{8}{u} \\ 2u &= 8 \\ u &= \mathbf{4} \end{aligned}$$

6.

	Percent	Actual Count
People invited	100	40
People who came	80	P

$$\begin{aligned} \frac{100}{80} &= \frac{40}{P} \\ 100P &= 3200 \\ P &= 32 \text{ people came} \\ 40 - 32 &= \mathbf{8\ people} \end{aligned}$$

7.

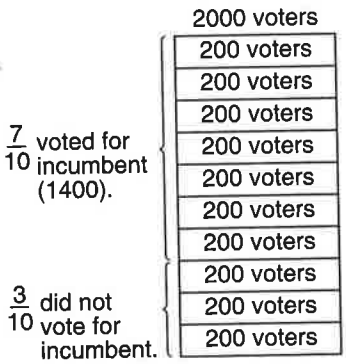
	Percent	Actual Count
Sale price	60	\$24
Regular price	100	R

$$\begin{aligned} \frac{60}{100} &= \frac{\$24}{R} \\ 60R &= \$2400 \\ R &= \mathbf{\$40} \end{aligned}$$

8.
$$\begin{aligned} \mathbf{2n + 3 = -13} \\ 2n + 3 - 3 &= -13 - 3 \\ 2n &= -16 \\ n &= \frac{-16}{2} \\ n &= \mathbf{-8} \end{aligned}$$

9.
$$\begin{aligned} (3x - 25) + (x + 5) &= 180° \\ 4x - 20 &= 180° \\ 4x - 20 + 20 &= 180° + 20 \\ 4x &= 200° \\ x &= \frac{200°}{4} \\ x &= 50° \end{aligned}$$
$$\mathbf{x + 5} = 50° + 5 = \mathbf{55°}$$
$$\mathbf{3x - 25} = 3(50°) - 25 = \mathbf{125°}$$

10.



(a) $1400 \div 7 = 200$
$10(200 \text{ voters}) = \mathbf{2000 \text{ voters}}$

(b) **30%**

11. $(3) + (3)(-2) - (3)(-2)$
$3 + (-6) - (-6)$
3

12. $a \circledast a - a$

13. $\frac{1 \text{ meter}}{4} = \frac{100 \text{ cm}}{4} = 25 \text{ cm}$
$(25 \text{ cm})(25 \text{ cm}) = \mathbf{625 \text{ cm}^2}$

14.
$$\begin{array}{r} \$12.95 \\ \$7.85 \\ +\ \$49.50 \\ \hline \$70.30 \end{array} \qquad \begin{array}{r} \$70.30 \\ \times\ \ 0.07 \\ \hline \$4.921 \end{array} \longrightarrow \$4.92$$

$$\begin{array}{r} \$70.30 \\ +\ \ \$4.92 \\ \hline \mathbf{\$75.22} \end{array}$$

15. $(3.5 \times 3) \times (10^5 \times 10^6) = 10.5 \times 10^{11}$
$= \mathbf{1.05 \times 10^{12}}$

16. (a) $\angle g$

(b) $\angle d$

(c) $\angle a$

(d) **70°**

17. (a) $1.25 \times 84 = W_N$
$\mathbf{105} = W_N$

(b) $1.25 \times 84 = \mathbf{105}$

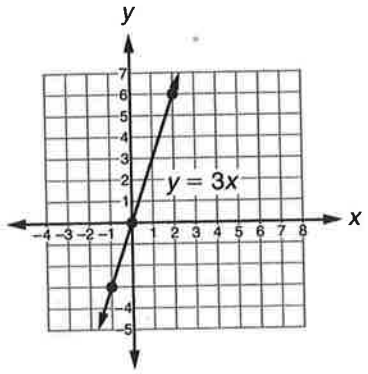
18. **3 to 2**

19. Area of base $= (6 \text{ ft})(4 \text{ ft}) = 24 \text{ ft}^2$
Volume $= (24 \text{ ft}^2)(3 \text{ ft}) = \mathbf{72 \text{ ft}^3}$

20. (a) $C \approx \frac{22}{7}(14 \text{ m})$
$C \approx \mathbf{44 \text{ m}}$

(b) $A \approx \frac{22}{7}(49 \text{ m}^2)$
$A \approx \mathbf{154 \text{ m}^2}$

21. $y = 3(2)$
$y = \mathbf{6};$
$y = 3(-1)$
$y = \mathbf{-3};$
$y = 3(0)$
$y = \mathbf{0}$



22. (a) $m\angle a = m\angle c = 180° - (90° + 34°)$
$= \mathbf{56°}$

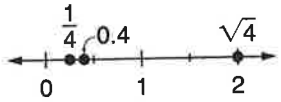
(b) $m\angle b = 90° - 56° = \mathbf{34°}$

(c) $m\angle c = 90° - 34° = \mathbf{56°}$

23.



24.



All three numbers are rational.

25. $3x + x + 3^0 = 49$
$4x + 1 = 49$
$4x + 1 - 1 = 49 - 1$
$4x = 48$
$x = \frac{48}{4}$
$x = \mathbf{12}$

26.
$$\begin{aligned} 3y + 2 &= y + 32 \\ 3y + 2 - y &= y + 32 - y \\ 2y + 2 &= 32 \\ 2y + 2 - 2 &= 32 - 2 \\ 2y &= 30 \\ \frac{2y}{2} &= \frac{30}{2} \\ y &= \mathbf{15} \end{aligned}$$

27.
$$\begin{aligned} x + 2(x + 3) &= 36 \\ x + 2x + 6 &= 36 \\ 3x + 6 - 6 &= 36 - 6 \\ 3x &= 30 \\ \frac{3x}{3} &= \frac{30}{3} \\ x &= \mathbf{10} \end{aligned}$$

28. (a)
$$\begin{aligned} &(3x^2y)(-2x)(xy^2) \\ &(3) \cdot x \cdot x \cdot y \cdot (-2) \cdot x \cdot x \cdot y \cdot y \\ &\mathbf{-6x^4y^3} \end{aligned}$$

(b)
$$\begin{aligned} &-3x + 2y - x - y \\ &-3x - x + 2y - y \\ &\mathbf{-4x + y} \end{aligned}$$

29. $\left(4\frac{1}{2}\right)\left(\frac{2}{10}\right)\left(\frac{100}{1}\right) = \frac{9}{\cancel{2}_1} \cdot \frac{\overset{1}{\cancel{2}}}{\cancel{10}_1} \cdot \frac{\overset{10}{\cancel{100}}}{1} = \mathbf{90}$

30.
$$\begin{aligned} &\frac{(-4)(+3)}{(-2)} - (-1) \\ &\frac{(-12)}{(-2)} + 1 \\ &6 + 1 \\ &\mathbf{7} \end{aligned}$$

Lesson 103, Lesson Practice

a. $(-5)(-4)(-3)(-2)(-1) = \mathbf{-120}$

b. $(+5)(-4)(+3)(-2)(+1) = \mathbf{120}$

c. $(-2)^3 = (-2)(-2)(-2) = \mathbf{-8}$

d. $(-3)^4 = (-3)(-3)(-3)(-3) = \mathbf{81}$

e. $(-9)^2 = (-9)(-9) = \mathbf{81}$

f. $(-1)^5 = (-1)(-1)(-1)(-1)(-1) = \mathbf{-1}$

g.
$$\begin{aligned} \frac{6a^2b^3c}{3ab} &= \frac{2 \cdot \overset{1}{\cancel{3}} \cdot \overset{1}{\cancel{a}} \cdot a \cdot \overset{1}{\cancel{b}} \cdot b \cdot b \cdot c}{\underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{a}} \cdot \underset{1}{\cancel{b}}} \\ &= \mathbf{2ab^2c} \end{aligned}$$

h.
$$\begin{aligned} \frac{8xy^3z^2}{6x^2y} &= \frac{\overset{1}{\cancel{2}} \cdot 2 \cdot 2 \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{y}} \cdot y \cdot y \cdot z \cdot z}{\underset{1}{\cancel{2}} \cdot 3 \cdot \underset{1}{\cancel{x}} \cdot x \cdot \underset{1}{\cancel{y}}} \\ &= \mathbf{\frac{4y^2z^2}{3x}} \end{aligned}$$

i.
$$\frac{15mn^2p}{25m^2n^2} = \frac{3 \cdot \overset{1}{\cancel{5}} \cdot \overset{1}{\cancel{m}} \cdot \overset{1}{\cancel{n}} \cdot \overset{1}{\cancel{n}} \cdot p}{\underset{1}{\cancel{5}} \cdot 5 \cdot \underset{1}{\cancel{m}} \cdot m \cdot \underset{1}{\cancel{n}} \cdot \underset{1}{\cancel{n}}} = \mathbf{\frac{3p}{5m}}$$

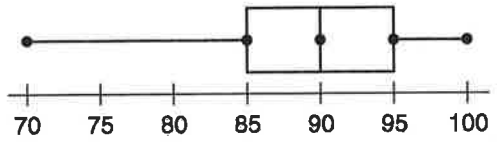
Lesson 103, Mixed Practice

1.
$$\begin{array}{r} \$25.00 \\ \times \quad 0.15 \\ \hline \mathbf{\$3.75} \end{array}$$

2. (a) **85**

(b) **90**

3.



4. $\frac{1280 \text{ kilometers}}{2.5 \text{ hours}} = \mathbf{512 \text{ kilometers per hour}}$

5.

	Case 1	Case 2
Dollars	$25	d
Hours	4	7

$$\begin{aligned} \frac{\$25}{4} &= \frac{d}{7} \\ 4d &= \$175 \\ d &= \mathbf{\$43.75} \end{aligned}$$

6.

	Percent	Ratio
Lights on	40	2
Lights off	60	3

$$\frac{40}{60} = \mathbf{\frac{2}{3}}$$

7.

	Percent	Actual Count
Original	100	O
− Change	20	\$25
New	80	N

$$\frac{100}{20} = \frac{O}{\$25}$$
$$20O = \$2500$$
$$O = \mathbf{\$125}$$

8.

	Percent	Actual Count
Original	100	\$30
+ Change	60	C
New	160	N

$$\frac{100}{60} = \frac{\$30}{C}$$
$$100C = \$1800$$
$$C = \mathbf{\$18}$$

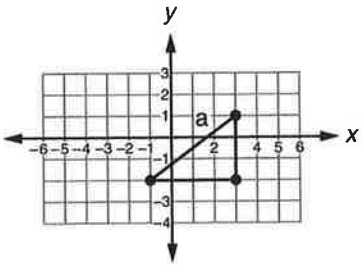
9. (a) 20 (54 inches) = **1080 inches**

(b) $\overset{90}{\cancel{1080}}$ $\cancel{\text{inches}} \cdot \frac{1 \text{ foot}}{\underset{1}{\cancel{12}} \cancel{\text{inches}}}$ = **90 feet**

10. $\mathbf{20^3 = 8000}$ **times**

11. $\frac{8}{5}$ (1000 meters) = **1600 meters**

12.



$$a^2 = (4 \text{ units})^2 + (3 \text{ units})^2$$
$$a^2 = 16 \text{ units}^2 + 9 \text{ units}^2$$
$$a^2 = 25 \text{ units}^2$$
$$a = \mathbf{5 \text{ units}}$$

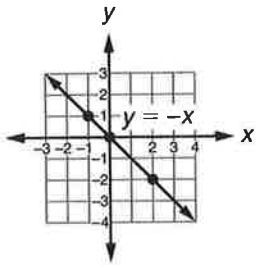
13. $\frac{35}{50} = \mathbf{70\%}$

14.
$$W_P \times 25 = 20$$
$$\frac{W_P \times 25}{25} = \frac{20}{25}$$
$$W_P = \frac{4}{5}$$
$$W_P = \frac{4}{5} \times 100\% = \mathbf{80\%}$$

15. (a) $\frac{120°}{360°} = \frac{1}{3}$

(b) $\frac{2}{3} \times 100\% = \mathbf{66\frac{2}{3}\%}$

16. $y = -2$;
$y = -0$
$y = \mathbf{0}$;
$y = -(-1)$
$y = \mathbf{1}$



17.
$$2x - 3 = -7$$
$$2x - 3 + 3 = -7 + 3$$
$$2x = -4$$
$$\frac{2x}{2} = \frac{-4}{2}$$
$$x = \mathbf{-2}$$

18. (a) $m\angle CAB = 90° - 36° = \mathbf{54°}$

(b) $m\angle CAD = m\angle ACB = \mathbf{36°}$

(c) $m\angle ACD = m\angle CAB = \mathbf{54°}$

19. (a) **See student work;**
$$\frac{x}{12} = \frac{12}{16}$$
$$16x = 144$$
$$x = \mathbf{9}$$

(b) $12f = 9$
$$\frac{12f}{12} = \frac{9}{12}$$
$$f = \frac{3}{4} = \mathbf{0.75}$$

20. **See student work; 50°**

21. (a) $C \approx 3.14$ (2 ft)
$C \approx \mathbf{6.28 \text{ ft}}$

(b) $A \approx 3.14(1 \text{ ft}^2)$
$A \approx \mathbf{3.14 \text{ ft}^2}$

22. $\sqrt{144} = 12$ and $\sqrt{169} = 13$
C. $\mathbf{\sqrt{150}}$ **is between** $\mathbf{\sqrt{144}}$ **and** $\mathbf{\sqrt{169}}$

23. Area of base $= \frac{(6 \text{ units})(3 \text{ units})}{2} = 9 \text{ units}^2$

Volume $= (9 \text{ units}^2)(6 \text{ units}) =$ **54 units^3**

24. Area of base $\approx 3.14(9 \text{ units}^2) \approx 28.26 \text{ units}^2$

Volume $\approx (28.26 \text{ units}^2)(3 \text{ units})$

$\approx$ **84.78 units^3**

25.
$$\begin{aligned} 3x + x - 5 &= 2(x - 2) \\ 4x - 5 &= 2x - 4 \\ 4x - 5 - 2x &= 2x - 4 - 2x \\ 2x - 5 &= -4 \\ 2x - 5 + 5 &= -4 + 5 \\ 2x &= 1 \\ \frac{2x}{2} &= \frac{1}{2} \\ x &= \mathbf{\frac{1}{2}} \end{aligned}$$

26.
$$\begin{aligned} 6\tfrac{2}{3}f - 5 &= 5 \\ 6\tfrac{2}{3}f - 5 + 5 &= 5 + 5 \\ 6\tfrac{2}{3}f &= 10 \\ \left(\tfrac{3}{20}\right)\left(\tfrac{20}{3}f\right) &= \left(\tfrac{3}{20}\right)10 \\ f &= \mathbf{\frac{3}{2}} \end{aligned}$$

27. $10\frac{1}{2} \cdot 1\frac{3}{7} \cdot 5^{-2} = \frac{\overset{3}{\cancel{21}}}{\underset{1}{\cancel{2}}} \cdot \frac{\overset{1}{\cancel{10}}}{\underset{1}{\cancel{7}}} \cdot \frac{1}{\underset{5}{\cancel{25}}} = \mathbf{\frac{3}{5}}$

28. $12\frac{1}{2} - 8\frac{1}{3} + 1\frac{1}{6}$

$= 12\frac{3}{6} - 8\frac{2}{6} + 1\frac{1}{6} = 5\frac{2}{6} = \mathbf{5\frac{1}{3}}$

29. (a) $\frac{(-3)(-2)(-1)}{-|(-3)(+2)|}$

$\frac{(6)(-1)}{-|(-6)|}$

$\frac{-6}{-(+6)}$

1

(b) $3^2 - (-3)^2 = 9 - (9) =$ **0**

30. (a) $\frac{6a^3b^2c}{2abc} = \frac{\overset{1}{\cancel{2}} \cdot 3 \cdot \overset{1}{\cancel{a}} \cdot a \cdot a \cdot \overset{1}{\cancel{b}} \cdot b \cdot \overset{1}{\cancel{c}}}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{a}} \cdot \underset{1}{\cancel{b}} \cdot \underset{1}{\cancel{c}}}$

$= \mathbf{3a^2b}$

(b) $\frac{8x^2yz^3}{12xy^2z} = \frac{\overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{2}} \cdot 2 \cdot \overset{1}{\cancel{x}} \cdot x \cdot \overset{1}{\cancel{y}} \cdot \overset{1}{\cancel{z}} \cdot z \cdot z}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot 3 \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{y}} \cdot y \cdot \underset{1}{\cancel{z}}}$

$= \mathbf{\frac{2xz^2}{3y}}$

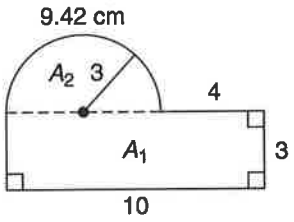
LESSON 104, LESSON PRACTICE

a. $C \approx \frac{3.14(6 \text{ cm})}{2}$

$C \approx 9.42 \text{ cm}$

Perimeter $\approx 3 \text{ cm} + 4 \text{ cm} + 9.42 \text{ cm} + 3 \text{ cm} + 10 \text{ cm} \approx$ **29.42 cm**

b.



$A_1 = (3 \text{ cm})(10 \text{ cm}) = 30 \text{ cm}^2$

$A_2 \approx \frac{3.14(9 \text{ cm}^2)}{2} \approx 14.13 \text{ cm}^2$

$A_1 + A_2 \approx$ **44.13 cm^2**

c. $\frac{45°}{360°} = \frac{1}{8}$

$A = \frac{\pi(16 \text{ cm}^2)}{8}$

$A = \frac{16\pi \text{ cm}^2}{8}$

$A = \mathbf{2\pi \text{ cm}^2}$

d. $C \approx \frac{3.14(8 \text{ cm})}{8}$

$C \approx 3.14 \text{ cm}$

Perimeter $\approx 3.14 \text{ cm} + 4 \text{ cm} + 4 \text{ cm} \approx$ **11.14 cm**

LESSON 104, MIXED PRACTICE

1.
$$\begin{array}{r} \$12.50 \\ \times \quad 0.4 \\ \hline \mathbf{\$5.00} \end{array}$$

2. $p(1, 1 \text{ or } 2 \text{ or } 4 \text{ or } 6) = \frac{1}{6} \cdot \frac{4}{6} = \frac{4}{36}$

$p(2, 1 \text{ or } 3 \text{ or } 5) = \frac{1}{6} \cdot \frac{3}{6} = \frac{3}{36}$

$p(3, 2 \text{ or } 4) = \frac{1}{6} \cdot \frac{2}{6} = \frac{2}{36}$

$p(4, 1 \text{ or } 3) = \frac{1}{6} \cdot \frac{2}{6} = \frac{2}{36}$

$p(5, 2 \text{ or } 6) = \frac{1}{6} \cdot \frac{2}{6} = \frac{2}{36}$

$p(6, 1 \text{ or } 5) = \frac{1}{6} \cdot \frac{2}{6} = \frac{2}{36}$

$$\frac{4}{36} + \frac{3}{36} + \frac{2}{36} + \frac{2}{36} + \frac{2}{36} + \frac{2}{36}$$

$$= \frac{\mathbf{15}}{\mathbf{36}} = \frac{\mathbf{5}}{\mathbf{12}}$$

3. $10(88) = 880$

$880 - 70 = 810$

$\frac{810}{9} = \mathbf{90}$

4. $\frac{\$3.42}{36 \text{ ounces}} = \frac{\$0.095}{1 \text{ ounce}}$

$\frac{\$3.84}{48 \text{ ounces}} = \frac{\$0.08}{1 \text{ ounce}}$

$\$0.095 - \$0.08 = \$0.015$

1.5¢ more per ounce

5.

	Case 1	Case 2
Pages	18	180
Minutes	30	m

$\frac{18}{30} = \frac{180}{m}$

$18m = 5400$

$m = 300$ minutes

$\frac{\overset{5}{\cancel{300}} \text{ minutes}}{} \cdot \frac{1 \text{ hour}}{\underset{1}{\cancel{60}} \text{ minutes}} = \mathbf{5 \text{ hours}}$

6. $\frac{5}{6} \times W_N = 75$

$\frac{6}{5}\left(\frac{5}{6} \times W_N\right) = \left(\frac{6}{5}\right)75$

$W_N = 90$

$\frac{3}{5}(90) = \mathbf{54}$

7.

	Ratio	Actual Count
Crawfish	2	C
Tadpoles	21	1932

$\frac{2}{21} = \frac{C}{1932}$

$21C = 3864$

$C = \mathbf{184 \text{ crawfish}}$

8. (a) $W_P \times \$60 = \$45$

$\frac{W_P \times \$60}{\$60} = \frac{\$45}{\$60}$

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

$W_P = \frac{3}{4} \times 100\% = \mathbf{75\%}$

(b) $M = \mathbf{0.45 \times \$60}$

$M = \mathbf{\$27}$

9. (a) $A = \pi(144 \text{ units}^2)$

$A = \mathbf{144\pi \text{ units}^2}$

(b) $C = \pi(24 \text{ units})$

$C = \mathbf{24\pi \text{ units}}$

10. $360° - (60° + 180°) = 120°$

$\frac{120°}{360°} = \frac{1}{3}$

$A = \frac{144\pi \text{ units}^2}{3}$

$A = \mathbf{48\pi \text{ units}^2}$

11. (a) $360° - 120° = \mathbf{240°}$

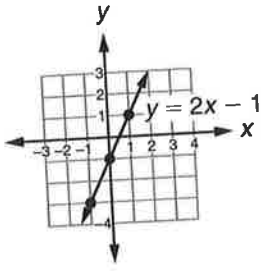
(b) $\frac{240°}{360°} = \frac{2}{3}$

$C = \frac{2(24\pi \text{ units})}{3}$

$C = \mathbf{16\pi \text{ units}}$

12. $y = 2x - 1$

x	y
-1	-3
0	-1
1	1



13. (a) $\frac{11}{500}$

(b) **0.022**

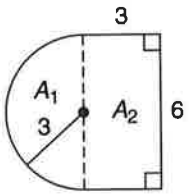
14. (a) **75 miles**

(b) **The car traveled about 60 miles in 1 hour, so its speed was about 60 miles per hour.**

15. $ab \Subset a - b$

16. $(3.6 \times 10^{-4})(9 \times 10^{8})$
32.4×10^{4}
$(3.24 \times 10^{1}) \times 10^{4}$
$\mathbf{3.24 \times 10^{5}}$

17.



$A_1 \approx \frac{3.14(9\text{ cm}^2)}{2}$
$A_1 \approx 14.13\text{ cm}^2$
$A_2 = (3\text{ cm})(6\text{ cm}) = 18\text{ cm}^2$
$A_1 + A_2 \approx \mathbf{32.13\text{ cm}^2}$

18. $C \approx \frac{3.14(6\text{ cm})}{2}$
$C \approx 9.42\text{ cm}$
Perimeter $\approx 3\text{ cm} + 9.42\text{ cm} + 3\text{ cm} + 6\text{ cm} \approx \mathbf{21.42\text{ cm}}$

19. (a) Area of base $= (1\text{ ft})(1\text{ ft}) = 1\text{ ft}^2$
Volume $= (1\text{ ft}^2)(1\text{ ft}) = 1\text{ ft}^3$
$1\text{ ft}^3 \cdot \frac{12\text{ in.}}{1\text{ ft}} \cdot \frac{12\text{ in.}}{1\text{ ft}} \cdot \frac{12\text{ in.}}{1\text{ ft}} = \mathbf{1728\text{ in.}^3}$

(b) $6(1\text{ ft}^2) = \mathbf{6\text{ ft}^2}$

20. $5(30°) = \mathbf{150°}$

21. $180° - 139° = 41°$
$m\angle x = 180° - (90° + 41°) = \mathbf{49°}$

22. (a) $\frac{x}{13} = \frac{6}{12}$
$12x = 78$
$x = \frac{78}{12}$
$x = \mathbf{6\frac{1}{2}}$

(b) $6f = 12$
$\frac{6f}{6} = \frac{12}{6}$
$f = \mathbf{2}$

(c) $(2)(2) = \mathbf{4\text{ times}}$

23. $12^2 + y^2 = 13^2$
$144 + y^2 = 169$
$144 + y^2 - 144 = 169 - 144$
$y^2 = 25$
$y = \mathbf{5}$

24. $2\frac{3}{4}w + 4 = 48$
$2\frac{3}{4}w + 4 - 4 = 48 - 4$
$2\frac{3}{4}w = 44$
$\left(\frac{4}{11}\right)\left(\frac{11}{4}w\right) = \left(\frac{4}{11}\right)44$
$w = \mathbf{16}$

25. $2.4n + 1.2n - 0.12 = 7.08$
$3.6n - 0.12 + 0.12 = 7.08 + 0.12$
$3.6n = 7.2$
$\frac{3.6n}{3.6} = \frac{7.2}{3.6}$
$n = \mathbf{2}$

26. $\sqrt{(3^2)(10^2)} = \sqrt{(9)(100)} = \sqrt{900} = \mathbf{30}$

27. (a) $\frac{24x^2y}{8x^3y^2} = \frac{\overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{2}} \cdot 3 \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{y}}}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{x}} \cdot x \cdot \underset{1}{\cancel{y}} \cdot y} = \frac{3}{xy}$

(b) $3x^2 + 2x(x - 1)$
$3x^2 + 2x^2 - 2x$
$\mathbf{5x^2 - 2x}$

28. $12\frac{1}{2} - \left(8\frac{1}{3} + 1\frac{1}{6}\right)$
$= 12\frac{3}{6} - \left(8\frac{2}{6} + 1\frac{1}{6}\right)$
$= 12\frac{3}{6} - 9\frac{3}{6} = \mathbf{3}$

29. $\left(4\frac{1}{6} \div 3\frac{3}{4}\right) \div 2.5$

$= \left(\frac{\overset{5}{\cancel{25}}}{\underset{3}{\cancel{6}}} \times \frac{\overset{2}{\cancel{4}}}{\underset{3}{\cancel{15}}}\right) \div 2\frac{1}{2} = \frac{10}{9} \div \frac{5}{2}$

$= \frac{\overset{2}{\cancel{10}}}{9} \times \frac{2}{\underset{1}{\cancel{5}}} = \mathbf{\frac{4}{9}}$

30. (a) $\frac{(-3)(4)}{-2} - \frac{(-3)(-4)}{-2}$

$\frac{(-12)}{-2} - \frac{(12)}{-2}$

$6 - (-6)$

12

(b) $\frac{(-2)^3}{(-2)^2} = \frac{\overset{1}{\cancel{(-2)}}\overset{1}{\cancel{(-2)}}(-2)}{\underset{1}{\cancel{(-2)}}\underset{1}{\cancel{(-2)}}} = \mathbf{-2}$

LESSON 105, LESSON PRACTICE

a.

	Area of rectangle	= (10 m)(4 m)	= 40 m^2
	Area of rectangle	= (10 m)(4 m)	= 40 m^2
	Area of rectangle	= (10 m)(4 m)	= 40 m^2
	Area of rectangle	= (10 m)(4 m)	= 40 m^2
	Area of square	= (4 m)(4 m)	= 16 m^2
+	Area of square	= (4 m)(4 m)	= 16 m^2
	Total surface area		= **192 m^2**

b.

Area of triangle	= $\frac{(6\text{ in.})(8\text{ in.})}{2}$	
	= 24 in.^{2}	
Area of triangle	= $\frac{(6\text{ in.})(8\text{ in.})}{2}$	
	= 24 in.^{2}	
Area of rectangle	= (10 in.)(10 in.)	
	= 100 in.^{2}	
Area of rectangle	= (10 in.)(8 in.)	
	= 80 in.^{2}	
+ Area of rectangle	= (10 in.)(6 in.)	
	= 60 in.^{2}	
Total surface area	= 24 in.^{2} + 24 in.^{2}	
	+ 100 in.^{2} + 80 in.^{2}	
	+ 60 in.^{2}	
	= **288 in.^{2}**	

c. Area = $\pi d \cdot$ height

Area $\approx$ (3.14)(10 cm)(4 cm)

Area $\approx$ **125.6 cm^2**

d. $A \approx 3.14(25\text{ cm}^2) \approx 78.5\text{ cm}^2$

	Area of top	= 78.5 cm^2
	Area of bottom	= 78.5 cm^2
+	Area of lateral surface	= 125.6 cm^2
	Total surface area	= **282.6 cm^2**

e. $A = 4\pi r^2$

$A \approx 4(3.14)(4\text{ cm}^2)$

$A \approx 50.24\text{ cm}^2$

$A \approx$ **50 cm^2**

f. **4, −4**

g. $\sqrt[3]{125} = \sqrt[3]{5 \cdot 5 \cdot 5} = \mathbf{5}$

h. $\sqrt[3]{-8} = \sqrt[3]{(-2) \cdot (-2) \cdot (-2)} = \mathbf{-2}$

LESSON 105, MIXED PRACTICE

1.

$$\begin{array}{r} \overset{1}{2}\overset{9}{\cancel{0}},{}^{1}0\,0\,0,0\,0\,0,0\,0\,0 \\ -\quad 9\,0\,0,0\,0\,0,0\,0\,0 \\ \hline 1\,9,1\,0\,0,0\,0\,0,0\,0\,0 \end{array}$$

1.91 × 10^{10}

2. Mean = 12.95 ÷ 5 = 2.59

Median − mean = 3.1 − 2.59 = **0.51**

3. $\sqrt{(10)^2 - (8)^2} = \sqrt{100 - 64} = \sqrt{36} = \mathbf{6}$

4. 6.5($8.50) = **$55.25**

5.

	Case 1	Case 2
Cost	$2.48	c
Kilograms	6	45

$\frac{\$2.48}{6} = \frac{c}{45}$

$6c = \$111.60$

$c =$ **$18.60**

6.

	Percent	Actual Count
Regular price	100	$30
Sale price	75	S

(a) $\frac{100}{75} = \frac{\$30}{S}$

$100S = \$2250$

$S =$ **$22.50**

(b) **75%**

7.

	Ratio	Actual Count
Whigs	7	W
Tories	3	T
Total	10	210

$$\frac{3}{10} = \frac{T}{210}$$
$$10T = 630$$
$$T = \mathbf{63\ Tories}$$

8.

	Percent	Actual Count
Original	100	\$60
− Change	30	C
New	70	N

$$\frac{100}{70} = \frac{\$60}{N}$$
$$100N = \$4200$$
$$N = \mathbf{\$42}$$

9. $60\ \cancel{\text{feet}} \cdot \frac{12\text{ inches}}{1\ \cancel{\text{foot}}} = 720\text{ inches}$

	Scale	Actual Count
Model	1	m
Airplane	36	720

$$\frac{1}{36} = \frac{m}{720}$$
$$36m = 720$$
$$m = \mathbf{20\ inches}$$

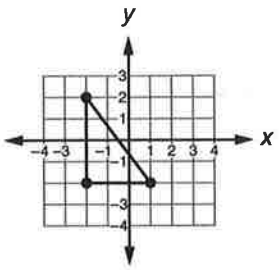
10. $4x + 5x = 180°$
$$9x = 180°$$
$$\frac{9x}{9} = \frac{180°}{9}$$
$$x = \mathbf{20°}$$

11. $\mathbf{W_P \times \$60 = \$3}$
$$\frac{W_P \times \$60}{\$60} = \frac{\$3}{\$60}$$
$$W_P = \frac{1}{20}$$
$$W_P = \frac{1}{20} \times 100\% = \mathbf{5\%}$$

12. $\mathbf{W_F = \frac{1}{10} \times 4}$
$$W_F = \mathbf{\frac{2}{5}}$$

13. $\mathbf{2x - 12 = 86}$
$$2x - 12 + 12 = 86 + 12$$
$$2x = 98$$
$$\frac{2x}{2} = \frac{98}{2}$$
$$x = \mathbf{49}$$

14.



$$a^2 = (4\text{ units})^2 + (3\text{ units})^2$$
$$a^2 = 16\text{ units}^2 + 9\text{ units}^2$$
$$a^2 = 25\text{ units}^2$$
$$a = \mathbf{5\ units}$$

15. $a^3 \textcircled{<} a^2$

16. $\frac{13}{52} \cdot \frac{12}{51} = \frac{156}{2652} = \mathbf{\frac{1}{17}}$

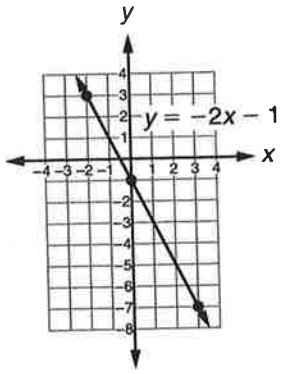
17. $A = 4\pi r^2$
$$A \approx 4(3.14)(100\text{ in.}^2)$$
$$A \approx \mathbf{1256\ in.^2}$$

18. $(8 \times 3.2) \times (10^{-4} \times 10^{-10})$
$$= 25.6 \times 10^{-14} = \mathbf{2.56 \times 10^{-13}}$$

19. $C \approx \frac{3.14(20\text{ m})}{2}$

$$C \approx 31.4\text{ m}$$
$$\text{Perimeter} \approx 31.4\text{ m} + 5\text{ m} + 30\text{ m} + 5\text{ m} + 10\text{ m} \approx \mathbf{81.4\ m}$$

20. $y = -2(3) - 1$
$y = \mathbf{-7}$;
$y = -2(-2) - 1$
$y = 4 - 1$
$y = \mathbf{3}$;
$y = -2(0) - 1$
$y = \mathbf{-1}$



21. (a) Volume $= (5\text{ mm})(5\text{ mm})(5\text{ mm})$
$= \mathbf{125\ mm^3}$

(b) Surface area $= 6(25\text{ mm}^2) = \mathbf{150\ mm^2}$

22. Area of base $\approx 3.14(100\text{ cm}^2) \approx 314\text{ cm}^2$
Volume $\approx (314\text{ cm}^2)(10\text{ cm}) \approx \mathbf{3140\ cm^3}$

23. Lateral surface area $\approx$
$(3.14)(20\text{ cm})(10\text{ cm}) \approx 628\text{ cm}^2$

Area of top	$= 314\text{ cm}^2$
Area of bottom	$= 314\text{ cm}^2$
+ Lateral surface area	$= 628\text{ cm}^2$
Total surface area	$= \mathbf{1256\ cm^2}$

24. $m\angle a = 180° - (90° + 30°) = 60°$
$m\angle y = m\angle a = 60°$
$m\angle b = 180° - (90° + 60°) = \mathbf{30°}$

25. (a) **See student work;**
$\frac{x}{6} = \frac{8}{12}$
$12x = 48$
$x = \mathbf{4}$

(b) $8f = 12$
$f = \frac{12}{8}$
$f = \frac{3}{2}$
$f = 1\frac{1}{2} = \mathbf{1.5}$

(c) $(1.5)^2 = \mathbf{2.25\ times}$

26. $4\frac{1}{2}x + 4 = 48 - x$
$4\frac{1}{2}x + 4 + x = 48 - x + x$
$5\frac{1}{2}x + 4 = 48$
$5\frac{1}{2}x + 4 - 4 = 48 - 4$
$5\frac{1}{2}x = 44$
$\left(\frac{2}{11}\right)\left(\frac{11}{2}x\right) = \left(\frac{2}{11}\right)44$
$x = \mathbf{8}$

27. $\frac{3.9}{75} = \frac{c}{25}$
$75c = 97.5$
$\frac{75c}{75} = \frac{97.5}{75}$
$c = \mathbf{1.3}$

28. $3.2 \div \left(2\frac{1}{2} \div \frac{5}{8}\right)$
$= 3\frac{2}{10} \div \left(\frac{5}{2} \times \frac{8}{5}\right) = \frac{32}{10} \div \frac{4}{1}$
$= \frac{32}{10} \times \frac{1}{4} = \mathbf{\frac{4}{5}}$ or $\mathbf{0.8}$

29. (a) $\frac{(2xy)(4x^2y)}{8x^2y}$
$= \frac{\overset{1}{2} \cdot \overset{1}{x} \cdot \overset{1}{y} \cdot \overset{1}{2} \cdot \overset{1}{2} \cdot \overset{1}{x} \cdot x \cdot y}{\underset{1}{2} \cdot \underset{1}{2} \cdot \underset{1}{2} \cdot \underset{1}{x} \cdot \underset{1}{x} \cdot \underset{1}{y}} = xy$

(b) $3(x - 3) - 3 = 3x - 9 - 3$
$= \mathbf{3x - 12}$

30. (a) $\frac{(-10)(-4) - (3)(-2)(-1)}{(-4) - (-2)}$
$\frac{(40) - (6)}{-2}$
$\frac{34}{-2}$
$\mathbf{-17}$

(b) $(-2)^4 - (-2)^2 + \sqrt[3]{-1} + 2^0$
$= (-2)(-2)(-2)(-2) - (-2)(-2)$
$+ \sqrt[3]{(-1)(-1)(-1)} + 1$
$= (16) - (4) + (-1) + 1 = \mathbf{12}$