22. $30 \times 10^5 = (5 \times 10^{-3})(6 \times 10^8)$
$= (5 \times 10^8)(6 \times 10^{-3})$

23. $13.2 = 1.2w$
$\frac{13.2}{1.2} = \frac{1.2w}{1.2}$
$\mathbf{11} = w$

check: $13.2 = 1.2(11)$
$13.2 = 13.2$

24. $c + \frac{5}{6} = 1\frac{1}{4}$
$c + \frac{5}{6} - \frac{5}{6} = 1\frac{1}{4} - \frac{5}{6}$
$c = 1\frac{3}{12} - \frac{10}{12}$
$c = \frac{15}{12} - \frac{10}{12}$
$c = \mathbf{\frac{5}{12}}$

check: $\frac{5}{12} + \frac{5}{6} = 1\frac{1}{4}$
$\frac{5}{12} + \frac{10}{12} = 1\frac{1}{4}$
$\frac{15}{12} = 1\frac{1}{4}$
$1\frac{3}{12} = 1\frac{1}{4}$
$1\frac{1}{4} = 1\frac{1}{4}$

25. $3\{20 - [6^2 - 3(10 - 4)]\}$
$3\{20 - [36 - 3(6)]\}$
$3\{20 - [36 - 18]\}$
$3\{20 - [18]\}$
$3\{2\}$
$\mathbf{6}$

26. (60 min) (60 s)

$$\begin{array}{r} \overset{2}{\cancel{3}}\text{ hr } \overset{14}{\cancel{15}}\text{ min } 25\text{ s} \\ -\ 2\text{ hr } 45\text{ min } 30\text{ s} \end{array} \longrightarrow$$

$$\begin{array}{r} \overset{2}{\cancel{3}}\text{ hr } \overset{74}{\cancel{15}}\text{ min } \overset{85}{\cancel{25}}\text{ s} \\ -\ 2\text{ hr } 45\text{ min } 30\text{ s} \\ \hline \mathbf{29\text{ min } 55\text{ s}} \end{array}$$

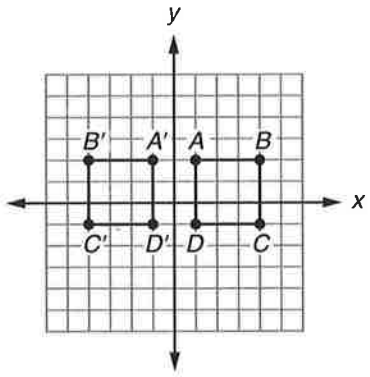
27. $1 + 0.2 + 0.25 = \mathbf{1.45}$

28. (a) $(-2) + (-2)(+2) - \frac{(-2)}{(-2)}$
$(-2) + (-4) - 1$
$(-2) + (-4) + [-(1)]$
$(-2) - (-4) + (-1)$
-7

(b) $(-3) - [(-2) - (+4)(-5)]$
$(-3) - [(-2) - (-20)]$
$(-3) - [(-2) + 20]$
$(-3) - [18]$
$(-3) + [-(18)]$
$(-3) + (-18)$
$\mathbf{-21}$

29. $x^2 + 6x - 2x - 12$
$\mathbf{x^2 + 4x - 12}$

30. (a) $\boldsymbol{D(1, -1)}$



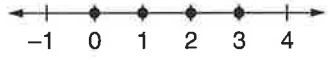
(b) $\boldsymbol{A'(-1, 2), B'(-4, 2),}$
$\boldsymbol{C'(-4, -1), D'(-1, -1)}$

Lesson 86, Lesson Practice

a.



b.



c. False

d. True

Lesson 86, Mixed Practice

1. $\frac{\$28.50}{3\text{ ounces}} = \frac{\$9.50}{1\text{ ounce}}$
$\frac{\$4.96}{8\text{ ounces}} = \frac{\$0.62}{1\text{ ounce}}$

$$\begin{array}{r} \$9.50 \\ -\ \$0.62 \\ \hline \end{array}$$

$8.88 more per ounce

2.

	Ratio	Actual Count
Rookies	2	R
Veterans	7	V
Total	9	252

$$\frac{2}{9} = \frac{R}{252}$$
$$9R = 504$$
$$R = \textbf{56 rookies}$$

3. (a) **213 lb**

(b) **213 lb**

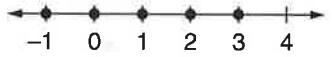
(c)
$$\begin{array}{r} 197 \\ 213 \\ 246 \\ 205 \\ 238 \\ 213 \\ +\ 207 \\ \hline 1519 \end{array} \qquad 7\overline{)1519} \quad \textbf{217 lb}$$

(d) **49 lb**

4. $12 \cancel{\text{bushels}} \cdot \dfrac{\textbf{4 pecks}}{\textbf{1 } \cancel{\textbf{bushel}}} = \textbf{48 pecks}$

5. $\dfrac{468 \text{ miles}}{9 \text{ hours}} = \textbf{52 miles per hour}$

6.



7.

	Case 1	Case 2
First number	9	n
Second number	6	30

$$\frac{9}{6} = \frac{n}{30}$$
$$6n = 270$$
$$n = \textbf{45}$$

8. (a) $1800 \div 10 = 180$

$9(180 \text{ students}) = \textbf{1620 students}$

(b) $\dfrac{1}{10} \times 100\% = \textbf{10\%}$

9. $\sqrt{(5)^2 - 4(1)(4)}$

$= \sqrt{25 - 16} = \sqrt{9} = \textbf{3}$

10. **Insufficient information**

11. (a) $C = \pi(24 \text{ in.})$

$C = \textbf{24}\pi \textbf{ in.}$

(b) $A = \pi r^2$

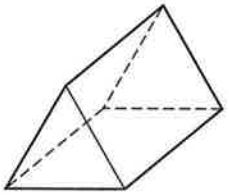
$A = \pi(144 \text{ in.}^2)$

$A = \textbf{144}\pi \textbf{ in.}^2$

12. (a) $\mathbf{10^5}$

(b) $\mathbf{10^{-3}}$

13.



(a) **5 faces**

(b) **9 edges**

(c) **6 vertices**

14. (a) $0.9 = \dfrac{\mathbf{9}}{\mathbf{10}}$

(b) $\mathbf{0.9 = 90\%}$

(c) $\dfrac{11}{12} = \mathbf{0.91\overline{6}}$

$$\begin{array}{r} 0.9166 \\ 12\overline{)11.0000\ldots} \\ \underline{10\ 8} \\ 20 \\ \underline{12} \\ 80 \\ \underline{72} \\ 80 \\ \underline{72} \\ 8 \end{array} \quad = \mathbf{0.91\overline{6}}$$

(d) $\dfrac{11}{12} \times 100\% = \dfrac{1100\%}{12} = \mathbf{91\frac{2}{3}\%}$

$$\begin{array}{r} 91\frac{8}{12} \\ 12\overline{)1100} \\ \underline{108} \\ 20 \\ \underline{12} \\ 8 \end{array} \quad = \mathbf{91\frac{2}{3}\%}$$

15. **North**

16.

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

$$\frac{60}{100} = \frac{\$24}{R}$$
$$60R = \$2400$$
$$R = \mathbf{\$40}$$

17.

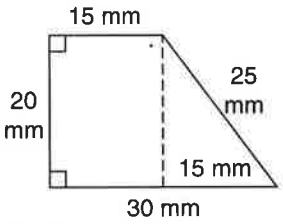
	Percent	Actual Count
Sprouted seeds	75	48
Unsprouted seeds	25	U
Total	100	T

$$\frac{75}{25} = \frac{48}{U}$$
$$75U = 1200$$
$$U = \mathbf{16\ seeds}$$

18. $\mathbf{30 = W_P \times 20}$

$$\frac{30}{20} = \frac{W_P \times 20}{20}$$
$$\frac{3}{2} = W_P$$
$$W_P = \frac{3}{2} \times 100\% = \mathbf{150\%}$$

19.



(a) **Trapezoid**

(b) Perimeter = 15 mm + 25 mm + 30 mm + 20 mm = **90 mm**

(c) Area of rectangle = (15 mm)(20 mm)
= 300 mm^2

Area of triangle $= \dfrac{(15\text{ mm})(20\text{ mm})}{2}$
= 150 mm^2

Area of figure = 300 mm^2 + 150 mm^2
= **450 mm^2**

20. (a) **120°**

(b) **165°**

(c) 165° − 30° = **135°**

21. $y = 3(4) + 1$
$y = 12 + 1$
$y = \mathbf{13;}$
$y = 3(7) + 1$
$y = 21 + 1$
$y = \mathbf{22;}$
$y = 3(0) + 1$
$y = 0 + 1$
$y = \mathbf{1}$

22. (a) $(1.2 \times 1.2) \times (10^5 \times 10^{-8})$
$= \mathbf{1.44 \times 10^{-3}}$

(b) $(6 \times 7) \times (10^{-3} \times 10^{-4})$
$= 42 \times 10^{-7}$
$= \mathbf{4.2 \times 10^{-6}}$

23. $56 = \frac{7}{8}w$

$\left(\frac{8}{7}\right)\cancel{56} = \left(\frac{\cancel{8}}{\cancel{7}}\right)\frac{\cancel{7}}{\cancel{8}}w$

$\mathbf{64} = w$

check: $56 = \frac{7}{\cancel{8}}(\cancel{64})$

$56 = 7(8)$
$56 = 56$

24. $4.8 + c = 7.34$
$4.8 - 4.8 + c = 7.34 - 4.8$
$c = \mathbf{2.54}$

check: $4.8 + 2.54 = 7.34$
$7.34 = 7.34$

25. $\sqrt{10^2 - 6^2} - \sqrt{10^2 - 8^2}$
$\sqrt{100 - 36} - \sqrt{100 - 64}$
$\sqrt{64} - \sqrt{36}$
$8 - 6$
$\mathbf{2}$

26.
$$\begin{array}{r} 5\text{ lb}\quad 9\text{ oz} \\ +\ 4\text{ lb}\quad 7\text{ oz} \\ \hline 9\text{ lb}\quad 16\text{ oz} \end{array}$$

16 oz = 1 lb

1 lb + 9 lb = **10 lb**

27. $1.4 \div 3.5 \times 1000$
$= 0.4 \times 1000 = \mathbf{400}$

28. (a) $(-4)(-5) - (-4)(+3)$
$+20 - (-12)$
$20 + [-(-12)]$
$+20 + 12$
$\mathbf{32}$

(b) $(-2)[(-3) - (-4)(+5)]$
$(-2)[(-3) - (-20)]$
$(-2)[(-3) + (20)]$
$(-2)[+17]$
$\mathbf{-34}$

29. $x^2 + 3xy + 2x^2 - xy$
$x^2 + 2x^2 + 3xy - xy$
$\mathbf{3x^2 + 2xy}$

30. $\mathbf{3 \cdot 3 \cdot x \cdot y \cdot y}$

Lesson 87, Lesson Practice

a. $(-3x)(-2xy)$
$= (-3) \cdot x \cdot (-2) \cdot x \cdot y$
$= (-3)(-2) \cdot x \cdot x \cdot y$
$= \mathbf{6x^2y}$

b. $3x^2(xy^3)$
$= (3) \cdot x \cdot x \cdot x \cdot y \cdot y \cdot y$
$= \mathbf{3x^3y^3}$

c. $(2a^2b)(-3ab^2)$
$= (2) \cdot a \cdot a \cdot b \cdot (-3) \cdot a \cdot b \cdot b$
$= (2)(-3) \cdot a \cdot a \cdot a \cdot b \cdot b \cdot b$
$= \mathbf{-6a^3b^3}$

d. $(-5x^2y)(-4x)$
$= (-5) \cdot x \cdot x \cdot y \cdot (-4) \cdot x$
$= (-5)(-4) \cdot x \cdot x \cdot x \cdot y$
$= \mathbf{20x^3y}$

e. $(-xy^2)(xy)(2y)$
$= (-1) \cdot x \cdot y \cdot y \cdot x \cdot y \cdot (2) \cdot y$
$= (-1)(2) \cdot x \cdot x \cdot y \cdot y \cdot y \cdot y$
$= \mathbf{-2x^2y^4}$

f. $(-3m)(-2mn)(m^2n)$
$= (-3) \cdot m \cdot (-2) \cdot m \cdot n \cdot m \cdot m \cdot n$
$= (-3)(-2) \cdot m \cdot m \cdot m \cdot m \cdot n \cdot n$
$= \mathbf{6m^4n^2}$

g. $(4wy)(3wx)(-w^2)(x^2y)$
$= (4) \cdot w \cdot y \cdot (3) \cdot w \cdot x \cdot (-1)$
$\quad \cdot w \cdot w \cdot x \cdot x \cdot y$
$= (4)(3)(-1) \cdot w \cdot w \cdot w \cdot w$
$\quad \cdot x \cdot x \cdot x \cdot y \cdot y$
$= \mathbf{-12w^4x^3y^2}$

h. $5d(-2df)(-3d^2fg)$
$= (5) \cdot d \cdot (-2) \cdot d \cdot f \cdot (-3) \cdot d \cdot d \cdot f \cdot g$
$= (5)(-2)(-3) \cdot d \cdot d \cdot d \cdot d \cdot f \cdot f \cdot g$
$= \mathbf{30d^4f^2g}$

Lesson 87, Mixed Practice

1. $2.5 \text{ hours} \cdot \dfrac{450 \text{ miles}}{1 \text{ hour}}$
$= \mathbf{1125 \text{ miles}}$

2. $\mathbf{12.5 \text{ centimeters} \cdot \dfrac{1 \text{ meter}}{100 \text{ centimeters}}}$
$= \mathbf{0.125 \text{ meter}}$

3.

	Ratio	Actual Count
Girls	4	240
Boys	3	180
Total	7	420

$\dfrac{\text{boys}}{\text{girls}} = \dfrac{3}{4}$

4.
$18' 3'' = 219''$
$17'10'' = 214''$
$+ \ 17'11'' = 215''$
$648''$

$3\overline{)648''}$ $\quad 216''$

$216'' = \mathbf{18'}$

5. $\dfrac{468 \text{ miles}}{18 \text{ gallons}} = \mathbf{26 \text{ miles per gallon}}$

6.



7.

	Case 1	Case 2
Yards	100	1500
Feet	36	f

$\dfrac{100}{36} = \dfrac{1500}{f}$
$100f = 54{,}000$
$f = \mathbf{540 \text{ feet}}$

8. (a) $m\angle a = 180° - 105° = \mathbf{75°}$

(b) $m\angle b = 180° - 75° = \mathbf{105°}$

(c) $m\angle c = 180° - 105° = \mathbf{75°}$

(d) $m\angle d = m\angle a = \mathbf{75°}$

(e) $m\angle e = m\angle b = \mathbf{105°}$

9. $y = 3(-4) - 1$
$y = -12 - 1$
$y = \mathbf{-13}$

10. (a) $C \approx \frac{22}{\cancel{7}_{1}}(\cancel{140}^{20}\ \text{mm})$

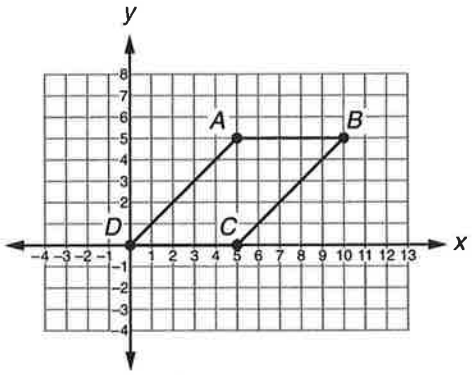
$C \approx \mathbf{440\ mm}$

(b) $A = \pi r^2$

$A \approx \frac{22}{\cancel{7}_{1}}(\cancel{4900}^{700}\ \text{mm}^2)$

$A \approx \mathbf{15{,}400\ mm^2}$

11.



(a) Area = (5 units)(5 units)
= **25 units²**

(b) $m\angle A = \mathbf{135°}$
$m\angle B = \mathbf{45°}$
$m\angle C = \mathbf{135°}$
$m\angle D = \mathbf{45°}$

12. Bottom Rectangular prism: (6 cubes) (3 cubes)
= 18 cubes

$\frac{18\ \text{cubes}}{1\ \cancel{\text{layer}}} \cdot 2\ \cancel{\text{layers}} = 36\ \text{cubes}$

$36\ \text{in.}^3$

Top Rectangular prism: (2 cubes) (3 cubes)
= 6 cubes

$\frac{6\ \text{cubes}}{1\ \cancel{\text{layer}}} \cdot 2\ \cancel{\text{layers}} = 12\ \text{cubes},\ 12\ \text{in.}^3$

$36\ \text{in.}^3 + 12\ \text{in.}^3 = \mathbf{48\ in.^3}$

13. (a) $12\frac{1}{2}\% = \frac{12\frac{1}{2}}{100} = \frac{\frac{25}{2}}{100}$

$= \frac{\frac{1}{100}}{\frac{1}{100}} = \frac{25}{200} = \mathbf{\frac{1}{8}}$

(b) $12\frac{1}{2}\% = 12.5\% = \mathbf{0.125}$

(c) $\frac{7}{8} = \mathbf{0.875}$

$$\begin{array}{r} \mathbf{0.875} \\ 8\overline{)7.000} \\ \underline{64} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

(d) $\frac{7}{8} \times 100\% = \frac{700\%}{8} = \mathbf{87\frac{1}{2}\%}$

$$\begin{array}{r} 87\ \frac{4}{8} = \mathbf{87\frac{1}{2}\%} \\ 8\overline{)700} \\ \underline{64} \\ 60 \\ \underline{56} \\ 4 \end{array}$$

14. $W_N = \mathbf{\frac{1}{4} \times 4}$

$W_N = \mathbf{1}$

15.

	Percent	Actual Count
Sale price	80	\$24
Regular price	100	P

$\frac{80}{100} = \frac{\$24}{P}$

$80P = \$2400$

$P = \mathbf{\$30}$

16.

	Percent	Actual Count
Meters ran	60	M
Meters left	40	2000
Total	100	T

$\frac{40}{100} = \frac{2000}{T}$

$40T = 200{,}000$

$T = \mathbf{5000\ meters}$

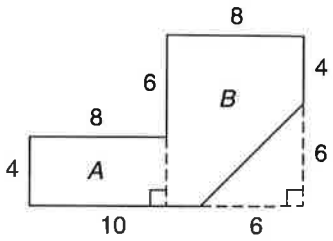
17. $\mathbf{100 = W_P \times 80}$

$\frac{100}{80} = \frac{W_P \times 80}{80}$

$\frac{5}{4} = W_P$

$W_P = \frac{5}{4} \times 100\% = \mathbf{125\%}$

18.



Area of rectangle A $= (4\text{ cm})(8\text{ cm})$
$= 32\text{ cm}^2$
Area of rectangle B $= (8\text{ cm})(10\text{ cm})$
$= 80\text{ cm}^2$
Area of $A + B$ $= 32\text{ cm}^2 + 80\text{ cm}^2$
$= 112\text{ cm}^2$
Area of triangle $= \dfrac{(6\text{ cm})(6\text{ cm})}{2}$
$= 18\text{ cm}^2$
$112\text{ cm}^2 - 18\text{ cm}^2 =$ **94 cm^2**

19. (a) $m\angle AOB = \dfrac{90°}{3} =$ **30°**

(b) $m\angle AOC = 30° + 30° =$ **60°**

(c) $m\angle EOC = 90° + 30° =$ **120°**

(d) $\angle COA$ or $\angle AOC$

20. $$\frac{66\frac{2}{3}}{100} = \frac{\frac{200}{3}}{\frac{100}{1}}$$

$$\frac{\frac{200}{3}}{\frac{100}{1}} \cdot \frac{\frac{1}{100}}{\frac{1}{100}} = \frac{\frac{200}{300}}{1} = \frac{200}{300}$$

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

21. $y = \dfrac{24}{3}$

$y =$ **8;**

$y = \dfrac{24}{4}$

$y =$ **6;**

$y = \dfrac{24}{12}$

$y =$ **2**

22. (a) $(4 \times 2.1) \times (10^{-5} \times 10^{-7})$
$=$ **8.4×10^{-12}**

(b) $(4 \times 6) \times (10^5 \times 10^7) = 24 \times (10^{12})$
$=$ **2.4×10^{13}**

23. $d - 8.47 = 9.1$
$d - 8.47 + 8.47 = 9.1 + 8.47$
$d =$ **17.57**

check: $17.57 - 8.47 = 9.1$
$9.1 = 9.1$

24. $0.25m = 3.6$
$\dfrac{0.25m}{0.25} = \dfrac{3.6}{0.25}$
$m =$ **14.4**

check: $0.25(14.4) = 3.6$
$3.6 = 3.6$

25. $$\frac{3 + 5.2 - 1}{4 - 3 + 2}$$
$$\frac{8.2 - 1}{1 + 2}$$
$$\frac{7.2}{3}$$
2.4

26. 1 kg = 1000 g, 1000 g − 75 g = **925 g**

27. $3.7 + 2.625 + 15 =$ **21.325**

28. (a) $(-5) - (-2)[(-3) - (+4)]$
$(-5) - (-2)[-7]$
$(-5) - (+14)$
$(-5) + [-(+14)]$
$(-5) + [-14]$
−19

(b) $$\frac{(-3) + (-3)(+4)}{(+3) + (-4)}$$
$$\frac{(-3) + (-12)}{-1}$$
$$\frac{-15}{-1}$$
15

29. (a) $(3x)(4y)$
$= (3) \cdot x \cdot (4) \cdot y$
$= (3)(4) \cdot x \cdot y =$ **$12xy$**

(b) $(6m)(-4m^2n)(-mnp)$
$= (6) \cdot m \cdot (-4) \cdot m \cdot m \cdot n \cdot (-1) \cdot m \cdot n \cdot p$
$= (6)(-4)(-1) \cdot m \cdot m \cdot m \cdot m \cdot n \cdot n \cdot p$
$=$ **$24m^4n^2p$**

30. $3ab + a - ab - 2ab + a$
$3ab - ab - 2ab + a + a$
$2a$

LESSON 88, LESSON PRACTICE

a. $5 \text{ yd} \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{12 \text{ in.}}{1 \text{ ft}} = \mathbf{180 \text{ in.}}$

b. $1\frac{1}{2} \text{ hr} \cdot \frac{60 \text{ min}}{1 \text{ hr}} \cdot \frac{60 \text{ s}}{1 \text{ min}}$
$= \mathbf{5400 \text{ s}}$

c. $15 \text{ yd}^2 \cdot \frac{3 \text{ ft}}{1 \text{ yd}} \cdot \frac{3 \text{ ft}}{1 \text{ yd}}$
$= \mathbf{135 \text{ ft}^2}$

d. $20 \text{ cm}^2 \cdot \frac{10 \text{ mm}}{1 \text{ cm}} \cdot \frac{10 \text{ mm}}{1 \text{ cm}}$
$= \mathbf{2000 \text{ mm}^2}$

LESSON 88, MIXED PRACTICE

1. $\$6(3.25) = \mathbf{\$19.50}$

2.
$4(93) = 372$
$10(84) = 840$
$840 - 372 = 468$
$6\overline{)468}$ **78**

3. $6 \text{ ft}^2 \cdot \frac{12 \text{ in.}}{1 \text{ ft}} \cdot \frac{12 \text{ in.}}{1 \text{ ft}} = \mathbf{864 \text{ in.}^2}$

4.

	Ratio	Actual Count
Woodwinds	3	15
Brass instruments	2	B

$\frac{3}{2} = \frac{15}{B}$
$3B = 30$
$B =$ **10 brass instruments**

5.



6.

	Case 1	Case 2
Artichokes	8	36
Price	\$2	p

$\frac{8}{\$2} = \frac{36}{p}$
$8p = \$72$
$p =$ **\$9**

7.

	27 lights
$\frac{2}{3}$ were on (18).	9 lights
	9 lights
$\frac{1}{3}$ were off.	9 lights

(a) $18 \div 2 = 9$, $1(9 \text{ lights}) =$ **9 lights**

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

8. $(5) - [(3) - (5 - 3)]$
$= 5 - [3 - 2] = 5 - [1] =$ **4**

9. $x \textcircled{<} y$

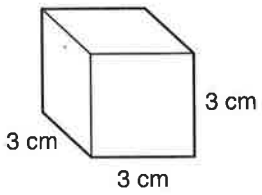
10. (a) $C = \pi(60 \text{ ft})$
$C \approx 3.14(60 \text{ ft})$
$C \approx$ **188.4 ft**

(b) $A = \pi r^2$
$A \approx 3.14(900 \text{ ft}^2)$
$A \approx$ **2826 ft²**

11. $1 - \left(\frac{4}{12} + \frac{5}{12}\right) = \frac{3}{12} = \frac{1}{4}$

$\frac{1}{4} \times 100\% =$ **25%**

12.



(a) $(3 \text{ cm})(3 \text{ cm}) = 9 \text{ cm}^2$
$\frac{9 \text{ cm}^2}{1 \text{ layer}} \cdot (1 \text{ cm})(3 \text{ layers}) =$ **27 cm³**

(b) $6(9 \text{ cm}^2) =$ **54 cm²**

13. $2x + 3y - 5 + x - y - 1$
$2x + x + 3y - y - 5 - 1$
$\mathbf{3x + 2y - 6}$

14. $x^2 + 2x - x - 2$
$\mathbf{x^2 + x - 2}$

15. (a) $0.125 = \frac{125}{100} = \mathbf{\frac{1}{8}}$

(b) $0.125 \times 100\% = 12.5\%$ or $\mathbf{12\frac{1}{2}\%}$

(c) $\frac{3}{8} = \mathbf{0.375}$

$$\begin{array}{r} 0.375 \\ 8\overline{)3.000} \\ \underline{24} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

(d) $\frac{3}{8} \times 100\% = \frac{300\%}{8} = \mathbf{37\frac{1}{2}\%}$

$$\begin{array}{r} 37\frac{4}{8} = 37\frac{1}{2}\% \\ 8\overline{)300} \\ \underline{24} \\ 60 \\ \underline{56} \\ 4 \end{array}$$

16. $\frac{60}{1\frac{1}{4}} = \frac{\frac{60}{1}}{\frac{5}{4}}$

$$\frac{\frac{60}{1}}{\frac{5}{4}} \cdot \frac{\frac{4}{5}}{\frac{4}{5}} = \frac{\frac{240}{5}}{1} = \frac{240}{5}$$

$$= \mathbf{48}$$

17.

	Percent	Actual Count
Sale price	P_S	\$18
Regular price	100	\$24

$$\frac{P_S}{100} = \frac{\$18}{\$24}$$
$$24P_S = 1800$$
$$P_S = \mathbf{75\%}$$

18.

	Percent	Actual Count
With seats	30	375
Without seats	70	W
Total	100	T

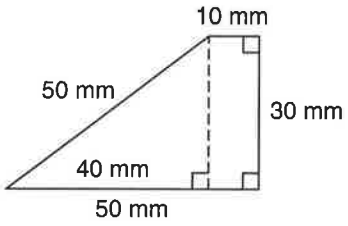
$$\frac{30}{70} = \frac{375}{W}$$
$$30W = 26{,}250$$
$$W = \mathbf{875}$$

19. $\mathbf{24 = \frac{1}{4} \times W_N}$

$$\left(\frac{4}{1}\right)24 = \left(\frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{4}}}\right)\left(\frac{\overset{1}{\cancel{4}}}{\underset{1}{\cancel{4}}}\right) \times W_N$$

$$\mathbf{96} = W_N$$

20.



(a) **Trapezoid**

(b) Perimeter = 10 mm + 30 mm + 50 mm + 50 mm = **140 mm**

(c) Area of rectangle = (10 mm)(30 mm)
= 300 mm²

Area of triangle = $\frac{(40 \text{ mm})(30 \text{ mm})}{2}$
= 600 mm²

Area of figure = 300 mm² + 600 mm²
= **900 mm²**

21. $y = (10) - 5$
$y = \mathbf{5}$;
$y = (7) - 5$
$y = \mathbf{2}$;
$y = (5) - 5$
$y = \mathbf{0}$

22. (a) $(9 \times 4) \times (10^{-6} \times 10^{-8})$
$= 36 \times (10^{-14})$
$= \mathbf{3.6 \times 10^{-13}}$

(b) $(9 \times 4) \times (10^{6} \times 10^{8})$
$= 36 \times (10^{14})$
$= \mathbf{3.6 \times 10^{15}}$

23. $8\frac{5}{6} = d - 5\frac{1}{2}$

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

$8\frac{5}{6} + 5\frac{3}{6} = d$

$13\frac{8}{6} = d$

$14\frac{2}{6} = d$

$\mathbf{14\frac{1}{3}} = d$

check: $8\frac{5}{6} = 14\frac{1}{3} - 5\frac{1}{2}$

$8\frac{5}{6} = 14\frac{2}{6} - 5\frac{3}{6}$

$8\frac{5}{6} = 13\frac{8}{6} - 5\frac{3}{6}$

$8\frac{5}{6} = 8\frac{5}{6}$

24. $\frac{5}{6}m = 90$

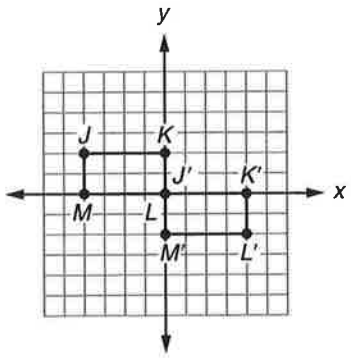
$\left(\frac{\cancel{6}^{1}}{\cancel{5}_{1}}\right)\left(\frac{\cancel{5}^{1}}{\cancel{6}_{1}}\right)m = \left(\frac{6}{\cancel{5}}\right)\cancel{90}^{18}$

$m = \mathbf{108}$

check: $\frac{5}{\cancel{6}_{1}}(\cancel{108}^{18}) = 90$

$90 = 90$

25.



(a) $M(-4, 0)$

(b) $J'(0, 0), K'(4, 0), L'(4, -2), M'(0, -2)$

26. **D.** $4^2 + 4$

27. $\frac{2}{3}(0.12) = 0.08$

$0.5(0.08) = \mathbf{0.04}$

28. $6\{5 \cdot 4 - 3[6 - (3 - 1)]\}$

$6\{20 - 3[6 - 2]\}$

$6\{20 - 3[4]\}$

$6\{20 - 12\}$

$6\{8\}$

48

29. (a) $\frac{(-3)(-4) - (-3)}{(-3) - (+4)(+3)}$

$\frac{12 - (-3)}{-3 - (12)}$

$\frac{12 + 3}{-3 - 12}$

$\frac{15}{-15}$

−1

(b) $(+5) + (-2)[(+3) - (-4)]$

$(+5) + (-2)[+3 + (+4)]$

$(+5) + (-2)[7]$

$(+5) + (-14)$

−9

30. (a) $(-2x)(-3x)$

$= (-2) \cdot x \cdot (-3) \cdot (x)$

$= (-2)(-3) \cdot x \cdot x = \mathbf{6x^2}$

(b) $(ab)(2a^2b)(-3a)$

$= a \cdot b \cdot (2) \cdot a \cdot a \cdot b \cdot (-3) \cdot a$

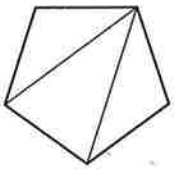
$= (2)(-3) \cdot a \cdot a \cdot a \cdot a \cdot b \cdot b$

$= \mathbf{-6a^4b^2}$

Lesson 89, Lesson Practice

a. **For answers, see solutions to examples 1–4.**

b. **One possibility:**



2 diagonals

c. **3 triangles**

d. $3 \times 180° = \mathbf{540°}$

e. $\frac{540°}{5} = \mathbf{108°}$

f. $\frac{360°}{5} = \mathbf{72°}$

g. $108° + 72° = \mathbf{180°}$

Lesson 89, Mixed Practice

1.

	Case 1	Case 2
Feet	440	5280
Seconds	10	s

$\frac{440}{10} = \frac{5280}{s}$

$440s = 52{,}800$

$s =$ **120 seconds** or **2 minutes**

2.

	Ratio	Actual Count
Lions	3	18
Tigers	2	T

$\frac{3}{2} = \frac{18}{T}$

$3T = 36$

$T = 12$ tigers

	Ratio	Actual Count
Tigers	3	12
Bears	4	B

$$\frac{3}{4} = \frac{12}{B}$$
$$3B = 48$$
$$B = \textbf{16 bears}$$

3. $(30\text{ cm})(15\text{ cm}) = 450\text{ cm}^2$

$$\frac{450\text{ cm}^2}{1\ \cancel{\text{layer}}} \cdot (1\text{ cm}) \cdot 12\ \cancel{\text{layers}} = \textbf{5400 cm}^3$$

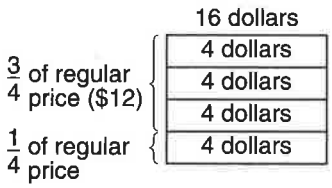
4. $\frac{24}{61} = 0.393442\ldots$ **0.393**

5. $\cancel{18}^{2}\ \cancel{\text{ft}^2} \cdot \frac{1\text{ yd}}{\cancel{3}\ \cancel{\text{ft}}} \cdot \frac{1\text{ yd}}{\cancel{3}\ \cancel{\text{ft}}} = \textbf{2 square yards}$

6.



7.



(a) $\$12 \div 3 = \$4$
$(\$4)(4) = \textbf{\$16}$

(b) $\frac{3}{4} \times 100\% = \textbf{75\%}$

8. (a) $m\angle a = 180° - (90° + 35°) = \textbf{55°}$

(b) $m\angle b = 180° - 55° = \textbf{125°}$

(c) $m\angle c = m\angle a = \textbf{55°}$

(d) $m\angle d = 180° - (55° + 70°) = \textbf{55°}$

9. (a) $C \approx \frac{22}{\cancel{7}_{1}}(\cancel{42}^{6}\text{ in.})$

$C \approx \textbf{132 in.}$

(b) $A = \pi r^2$

$A \approx \frac{22}{\cancel{7}_{1}}(\cancel{441}^{63}\text{ in.}^2)$

$A \approx \textbf{1386 in.}^2$

10. $\dfrac{91\frac{2}{3}}{100} = \dfrac{\frac{275}{3}}{\frac{100}{1}}$

$$\frac{\frac{275}{3}}{\frac{100}{1}} \cdot \frac{\frac{1}{100}}{\frac{1}{100}} = \frac{\frac{275}{300}}{1} = \frac{275}{300}$$
$$= \frac{\mathbf{11}}{\mathbf{12}}$$

11. $\dfrac{(10)(5) + (10)}{(10) + (5)} = \dfrac{50 + 10}{15}$

$$= \frac{60}{15} = \textbf{4}$$

12. $0.25 \bigcirc 0.5$

$a^2 \circledcirc a$

13. (a) $\frac{7}{8} = \textbf{0.875}$

$$8\overline{)7.000}$$
$$\begin{array}{r} 0.875 \\ 8\overline{)7.000} \\ \underline{64} \\ 60 \\ \underline{56} \\ 40 \\ \underline{40} \\ 0 \end{array}$$

(b) $\frac{7}{8} \times 100\% = \frac{700\%}{8} = \textbf{87}\frac{\mathbf{1}}{\mathbf{2}}\textbf{\%}$

$$\begin{array}{r} 87\frac{4}{8} = 87\frac{1}{2}\% \\ 8\overline{)700} \\ \underline{64} \\ 60 \\ \underline{56} \\ 4 \end{array}$$

(c) $875\% = \frac{875}{100} = 8\frac{75}{100} = \textbf{8}\frac{\mathbf{3}}{\mathbf{4}}$

(d) $875\% = \textbf{8.75}$

14. (a) **4:00, 8:00**

(b) **120°**

15.

	Percent	Actual Count
Ordered a hambuger	45	H
Other customers	55	C
Total	100	3000

$$\frac{45}{100} = \frac{H}{3000}$$
$$100H = 135{,}000$$
$$H = \textbf{1350 customers}$$

16.

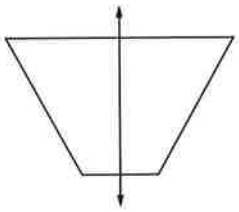
	Percent	Actual Count
Sale price	75	\$24
Regular price	100	R

$$\frac{75}{100} = \frac{\$24}{R}$$
$$75R = \$2400$$
$$R = \$32$$
$$\$32 - \$24 = \mathbf{\$8}$$

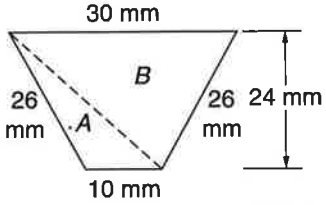
17. $\mathbf{20 = W_P \times 200}$

$$\frac{20}{200} = \frac{W_P \times 200}{200}$$
$$\frac{1}{10} = W_P$$
$$W_P = \frac{1}{10} \times 100\% = \mathbf{10\%}$$

18. (a)



(b)



Area of triangle A $= \dfrac{(10\text{ mm})(24\text{ mm})}{2}$

$= 120\text{ mm}^2$

Area of triangle B $= \dfrac{(30\text{ mm})(24\text{ mm})}{2}$

$= 360\text{ mm}^2$

Area of figure $= 120\text{ mm}^2 + 360\text{ mm}^2$

$= \mathbf{480\text{ mm}^2}$

19. $\dfrac{360°}{3} = \mathbf{120°}$

20. $y = \frac{1}{3}(12)$

$y = \mathbf{4};$

$y = \frac{1}{3}(9)$

$y = \mathbf{3};$

$6 = \frac{1}{3}x$

$\left(\frac{3}{1}\right)6 = \left(\frac{3}{1}\right)\frac{1}{3}x$

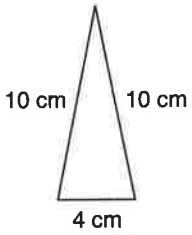
$\mathbf{18} = x$

21. $(1.25 \times 8) \times (10^{-3} \times 10^{-5})$

$= 10 \times 10^{-8}$

$= \mathbf{1 \times 10^{-7}}$

22. (a)



Perimeter $= 10\text{ cm} + 10\text{ cm} + 4\text{ cm}$

$= \mathbf{24\text{ cm}}$

(b) **There can only be one answer. A triangle with side lengths of 4 cm, 4 cm, and 10 cm cannot exist.**

23. $\frac{4}{9}p = 72$

$\left(\frac{\cancel{9}^{1}}{\cancel{4}_{1}}\right)\frac{\cancel{4}^{1}}{\cancel{9}_{1}}p = \left(\frac{9}{\cancel{4}_{1}}\right)\cancel{72}^{18}$

$p = \mathbf{162}$

check: $\frac{4}{\cancel{9}_{1}}(\cancel{162}^{18}) = 72$

$4(18) = 72$

$72 = 72$

24. $12.3 = 4.56 + f$

$12.3 - 4.56 = 4.56 - 4.56 + f$

$\mathbf{7.74} = f$

check: $12.3 = 4.56 + 7.74$

$12.3 = 12.3$

25. $2x + 3y - 4 + x - 3y - 1$

$2x + x + 3y - 3y - 4 - 1$

$\mathbf{3x - 5}$

26. $\dfrac{9 \cdot 8 - 7 \cdot 6}{6 \cdot 5}$

$\dfrac{72 - 42}{30}$

$\dfrac{30}{30}$

$\mathbf{1}$

27. $3\frac{2}{10} \times \frac{1}{4^2} \times 10^2$

$3\frac{2}{10} \times \frac{1}{16} \times 100$

$= \frac{\cancel{32}^{2}}{\cancel{10}_{1}} \times \frac{1}{\cancel{16}_{1}} \times \frac{\cancel{100}^{10}}{1} = \mathbf{20}$

28. $4.75 + \frac{3}{4} = 4\frac{3}{4} + \frac{3}{4}$

$= 4\frac{6}{4} = 5\frac{2}{4} = 5\frac{1}{2}$

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

$= 12\frac{8}{6} - 5\frac{3}{6} = \mathbf{7\frac{5}{6}}$

29. (a) $\dfrac{(+3) + (-4)(-6)}{(-3) + (-4) - (-6)}$

$\dfrac{(+3) + (24)}{-7 - (-6)}$

$\dfrac{27}{-1}$

$\mathbf{-27}$

(b) $(-5) - (+6)(-2) + (-2)(-3)(-1)$

$(-5) - (-12) + (-6)$

$(-5) + (+12) + (-6)$

$\mathbf{1}$

30. (a) $(3x^2)(2x)$

$= (3) \cdot x \cdot x \cdot (2) \cdot x$

$= (3)(2) \cdot x \cdot x \cdot x$

$= \mathbf{6x^3}$

(b) $(-2ab)(-3b^2)(-a)$

$= (-2) \cdot a \cdot b \cdot (-3) \cdot b \cdot b \cdot (-1) \cdot a$

$= (-2)(-3)(-1) \cdot a \cdot a \cdot b \cdot b \cdot b$

$= \mathbf{-6a^2b^3}$

Lesson 90, Lesson Practice

a. $1\frac{1}{8}x = 36$

$\frac{9}{8}x = 36$

$\left(\frac{\cancel{8}^{1}}{\cancel{9}_{1}}\right)\left(\frac{\cancel{9}^{1}}{\cancel{8}_{1}}x\right) = \left(\frac{8}{\cancel{9}_{1}}\right) \cdot \cancel{36}^{4}$

$x = \mathbf{32}$

b. $3\frac{1}{2}a = 490$

$\frac{7}{2}a = 490$

$\left(\frac{\cancel{2}^{1}}{\cancel{7}_{1}}\right)\left(\frac{\cancel{7}^{1}}{\cancel{2}_{1}}a\right) = \left(\frac{2}{\cancel{7}_{1}}\right)\cancel{490}^{70}$

$a = \mathbf{140}$

c. $2\frac{3}{4}w = 6\frac{3}{5}$

$\frac{11}{4}w = \frac{33}{5}$

$\left(\frac{\cancel{4}^{1}}{\cancel{11}_{1}}\right)\left(\frac{\cancel{11}^{1}}{\cancel{4}_{1}}w\right) = \left(\frac{4}{\cancel{11}_{1}}\right)\left(\frac{\cancel{33}^{3}}{5}\right)$

$w = \mathbf{\frac{12}{5}}$

d. $2\frac{2}{3}y = 1\frac{4}{5}$

$\frac{8}{3}y = \frac{9}{5}$

$\left(\frac{\cancel{3}^{1}}{\cancel{8}_{1}}\right)\left(\frac{\cancel{8}^{1}}{\cancel{3}_{1}}y\right) = \left(\frac{3}{8}\right)\left(\frac{9}{5}\right)$

$y = \mathbf{\frac{27}{40}}$

e. $-3x = 0.45$

$\frac{-3x}{-3} = \frac{0.45}{-3}$

$x = \mathbf{-0.15}$

f. $-\frac{3}{4}m = \frac{2}{3}$

$\left(-\frac{\cancel{4}^{1}}{\cancel{3}_{1}}\right)\left(-\frac{\cancel{3}^{1}}{\cancel{4}_{1}}m\right) = \left(-\frac{4}{3}\right)\left(\frac{2}{3}\right)$

$m = \mathbf{-\frac{8}{9}}$

g. $-10y = -1.6$

$\frac{-10y}{-10} = \frac{-1.6}{-10}$

$y = \mathbf{0.16}$

h. $-2\frac{1}{2}w = 3\frac{1}{3}$

$-\frac{5}{2}w = \frac{10}{3}$

$\left(-\frac{\cancel{2}^{1}}{\cancel{5}_{1}}\right)\left(-\frac{\cancel{5}^{1}}{\cancel{2}_{1}}w\right) = \left(-\frac{2}{\cancel{5}_{1}}\right)\left(\frac{\cancel{10}^{2}}{3}\right)$

$w = \mathbf{-\frac{4}{3}}$

Lesson 90, Mixed Practice

1. $(0.8 + 0.9) - (0.8)(0.9)$

$= 1.7 - 0.72 = 0.98$

Ninety-eight hundredths

2. (a)
$$\begin{array}{r} 8 \\ 6 \\ 9 \\ 10 \\ 8 \\ 7 \\ 9 \\ 10 \\ 8 \\ 10 \\ 9 \\ +\ \ 8 \\ \hline 102 \end{array} \qquad \begin{array}{r} \textbf{8.5} \\ 12\overline{)102.0} \end{array}$$

(b) **8.5**

(c) **8**

(d) $2\frac{2}{3}y = 1\frac{4}{5}$

$\frac{8}{3}y = \frac{9}{5}$

$\left(\frac{3}{8}\right)\left(\frac{8}{3}y\right) = \left(\frac{3}{8}\right)\left(\frac{9}{5}\right)$

$y = \mathbf{\frac{27}{40}}$

3. $\frac{\$1.20}{24 \text{ ounces}} = \frac{\$0.05}{1 \text{ ounce}}$

$\frac{\$1.44}{32 \text{ ounces}} = \frac{\$0.045}{1 \text{ ounce}}$

$$\begin{array}{r} \$0.050 \\ -\ \$0.045 \\ \hline \$0.005 \end{array}$$

0.5¢ more per ounce

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

(b) $180° - 36° = \mathbf{144°}$

5. $x^2 + 2xy + y^2 + x^2 - y^2$

$x^2 + x^2 + 2xy + y^2 - y^2$

$\mathbf{2x^2 + 2xy}$

6.

	Percent	Actual Count
Sale price	90	\$36
Regular price	100	R

$\frac{90}{100} = \frac{\$36}{R}$

$90R = \$3600$

$R = \mathbf{\$40}$

7.

	Percent	Actual Count
Voted for Graham	75	V
Did not vote for Graham	25	D
Total	100	800

$\frac{25}{100} = \frac{D}{800}$

$100D = 20{,}000$

$D = \mathbf{200 \text{ citizens}}$

8. (a) $\mathbf{24 = W_P \times 30}$

$\frac{24}{30} = \frac{W_P \times 30}{30}$

$\frac{4}{5} = W_P$

$W_P = \frac{4}{5} \times 100\% = \mathbf{80\%}$

(b) $\mathbf{30 = W_P \times 24}$

$\frac{30}{24} = \frac{W_P \times 24}{24}$

$\frac{5}{4} = W_P$

$W_P = \frac{5}{4} \times 100\% = \mathbf{125\%}$

9. $2 \cancel{\text{ft}^2} \cdot \frac{12 \text{ in.}}{1 \cancel{\text{ft}}} \cdot \frac{12 \text{ in.}}{1 \cancel{\text{ft}}} = \mathbf{288 \text{ square inches}}$

10.

750 doctors

$\frac{2}{5}$ of doctors (300) did.	150 doctors
	150 doctors
$\frac{3}{5}$ of doctors did not.	150 doctors
	150 doctors
	150 doctors

(a) $300 \div 2 = 150$

$5(150 \text{ doctors}) = \mathbf{750 \text{ doctors}}$

(b) $3(150 \text{ doctors}) = \mathbf{450 \text{ doctors}}$

11. $y = 2(4.5) + 1$

$y = 9 + 1$

$y = \mathbf{10}$

12. $a \circledcirc ab$

13. $\frac{12 \text{ inches}}{4} = 3 \text{ inches}$

$(3 \text{ inches})(3 \text{ inches}) = \mathbf{9 \text{ square inches}}$

14. (a) $1.75 = 1\frac{75}{100} = \mathbf{1\frac{3}{4}}$

(b) $1.75 \times 100\% = \mathbf{175\%}$

15.
$$\begin{array}{r} \$325 \\ \times\ 0.06 \\ \hline \$19.50 \end{array}$$

$$\begin{array}{r} \$325 \\ +\ \$19.50 \\ \hline \mathbf{\$344.50} \end{array}$$

16. $(6 \times 8) \times (10^4 \times 10^{-7})$
$= (48 \times (10^{-3})$
$= \mathbf{4.8 \times 10^{-2}}$

17. (a) $(8 \text{ in.})(3 \text{ in.}) = 24 \text{ in.}^2$

$$\frac{24 \text{ in.}^2}{1 \cancel{\text{layer}}} \cdot (1 \text{ in.}) \cdot (12 \cancel{\text{layers}}) = \mathbf{288 \text{ in.}^3}$$

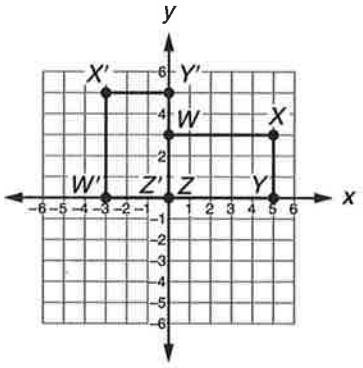
(b) $2(8 \text{ in.} \times 12 \text{ in.}) + 2(8 \text{ in.} \times 3 \text{ in.})$
$+ 2(12 \text{ in.} \times 3 \text{ in.})$
$= 192 \text{ in}^2 + 48 \text{ in.}^2 + 72 \text{ in.}^2$
$= \mathbf{312 \text{ in.}^2}$

18. (a) $C \approx 3.14(100 \text{ mm})$
$C \approx \mathbf{314 \text{ mm}}$

(b) $A = \pi r^2$
$A \approx 3.14(2500 \text{ mm}^2)$
$A \approx \mathbf{7850 \text{ mm}^2}$

19. **0**

20.

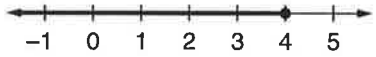


(a) Z **(0, 0)**

(b) $W'(-3, 0), X'(-3, 5), Y'(0, 5), Z'(0, 0)$

21. $\frac{2}{3} \times 20 = \frac{40}{3} = \mathbf{13\frac{1}{3}}$

22.



23. $x + 3.5 = 4.28$
$x + 3.5 - 3.5 = 4.28 - 3.5$
$x = \mathbf{0.78}$

24. $2\frac{2}{3}w = 24$

$\frac{8}{3}w = 24$

$\left(\frac{\cancel{3}}{\cancel{8}}\right)\left(\frac{\cancel{8}}{\cancel{3}}\right)w = \left(\frac{3}{8}\right)\cancel{24}$

$w = \mathbf{9}$

25. $-4y = 1.4$

$\frac{-4y}{-4} = \frac{1.4}{-4}$

$y = \mathbf{-0.35}$

26. $10^1 + 10^0 + 10^{-1}$
$= 10 + 1 + \frac{1}{10} = 11 + 0.1$
$= \mathbf{11.1}$

27. $(-2x^2)(-3xy)(-y)$
$= (-2) \cdot x \cdot x \cdot (-3) \cdot x \cdot y \cdot (-1) \cdot y$
$= (-2)(-3)(-1) \cdot x \cdot x \cdot x \cdot y \cdot y$
$= \mathbf{-6x^3y^2}$

28.
$$\begin{array}{rr} & \frac{8}{75} = \frac{32}{300} \\ - & \frac{9}{100} = \frac{27}{300} \\ \hline & \frac{5}{300} = \mathbf{\frac{1}{60}} \end{array}$$

29. (a) $(-3) + (-4)(-5) - (-6)$
$(-3) + (20) + (+6)$
$(-3) + (26)$
23

(b) $\dfrac{(-2)(-4)}{(-4) - (-2)}$

$\dfrac{8}{-2}$

$\mathbf{-4}$

30. $10^2 - 5^2 = 100 - 25 = 75$
$(10 + 5)(10 - 5) = (15)(5) = 75$
$75 = 75$
$x^2 - y^2 \stackrel{?}{=} (x + y)(x - y)$