24. $\frac{w}{2} = \frac{18}{w}$

$w^2 = 36$

$w = \mathbf{6, -6}$

25. $3\frac{1}{3}w^2 - 4 = 26$

$3\frac{1}{3}w^2 - 4 + 4 = 26 + 4$

$\frac{10}{3}w^2 = 30$

$\left(\frac{3}{10}\right)\frac{10}{3}w^2 = \left(\frac{3}{10}\right)30$

$w^2 = 9$

$w = \mathbf{3, -3}$

26. $16 - \{27 - 3[8 - (3^2 - 2^3)]\}$

$16 - \{27 - 3[8 - (9 - 8)]\}$

$16 - \{27 - 3[8 - (1)]\}$

$16 - \{27 - 3[7]\}$

$16 - \{27 - 21\}$

$16 - \{6\}$

10

27. $\frac{(6ab^2)(8ab)}{12a^2b^2}$

$= \frac{\overset{1}{2} \cdot \overset{1}{3} \cdot \overset{1}{a} \cdot \overset{1}{b} \cdot \overset{1}{b} \cdot \overset{1}{2} \cdot 2 \cdot 2 \cdot \overset{1}{a} \cdot b}{\underset{1}{2} \cdot \underset{1}{2} \cdot \underset{1}{3} \cdot \underset{1}{a} \cdot \underset{1}{a} \cdot \underset{1}{b} \cdot \underset{1}{b}}$

$= \mathbf{4b}$

28. $3\frac{1}{3} + 1\frac{1}{2} + 4\frac{5}{6}$

$= 3\frac{2}{6} + 1\frac{3}{6} + 4\frac{5}{6} = 8\frac{10}{6} = 9\frac{4}{6}$

$= \mathbf{9\frac{2}{3}}$

29. $20 \div \left(3\frac{1}{3} \div 1\frac{1}{5}\right) = 20 \div \left(\frac{\overset{5}{\cancel{10}}}{3} \times \frac{5}{\underset{3}{\cancel{6}}}\right)$

$= 20 \div \frac{25}{9} = \frac{\overset{4}{\cancel{20}}}{1} \times \frac{9}{\underset{5}{\cancel{25}}} = \frac{36}{5} = 7\frac{1}{5}$

30. $(-3)^2 + (-2)^3 = 9 + (-8) = 1$

Lesson 111, Lesson Practice

a. $2\overline{)3.6}$ $\quad$ **1.8×10^6**

b. $25\overline{)75}$ $\quad$ **3×10^{-6}**

c. $3\overline{)4.5}$ $\quad$ **1.5×10^{-4}**

d. $15\overline{)60}$ $\quad$ **4×10^4**

e. $8\overline{)4.0}$

$0.5 \times 10^8 \longrightarrow \mathbf{5 \times 10^7}$

f. $3\overline{)1.5}$

$0.5 \times 10^{-8} \longrightarrow \mathbf{5 \times 10^{-9}}$

g. $6\overline{)3.6}$

$0.6 \times 10^{-6} \longrightarrow \mathbf{6 \times 10^{-7}}$

h. $9\overline{)1.8}$

$0.2 \times 10^6 \longrightarrow \mathbf{2 \times 10^5}$

Lesson 111, Mixed Practice

1. $\begin{array}{r} 1909 \\ -\ 1859 \\ \hline 50 \end{array}$

50 years + 1 year = **51 years (The year 1859 should be counted.)**

2. $15y = 600$

$\frac{15y}{15} = \frac{600}{15}$

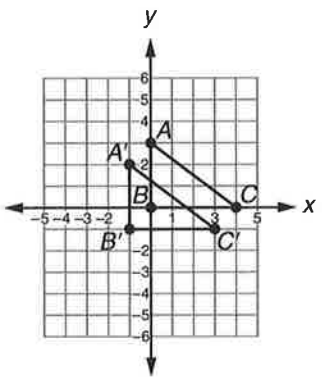
$y = 40$

$40 + 15 = \mathbf{55}$

3. (a) $70\% = \frac{70}{100} = \mathbf{\frac{7}{10}}$

(b) $\frac{\text{agreed}}{\text{disagreed}} = \mathbf{\frac{3}{7}}$

4.



A′(−1, 2), B′(−1, −1), C′(3, −1)

5. (a) 2^{10}

(b) **32**

6. (a) $180° - 150° = \mathbf{30°}$

(b) $\frac{360°}{30°} = 12$, **12 sides**

(c) **Dodecagon**

7. $\frac{100}{60} = \frac{p}{\$48}$

$60p = \$4800$

$p = \mathbf{\$80}$.

8. (a) $P(R, W, B) = \frac{3}{12} \cdot \frac{4}{11} \cdot \frac{5}{10} = \frac{1}{22}$

(b) $P(B, W, R) = \frac{5}{12} \cdot \frac{4}{11} \cdot \frac{3}{10} = \frac{1}{22}$

9. $2x + 6 = 36$

$2x + 6 - 6 = 36 - 6$

$2x = 30$

$\frac{2x}{2} = \frac{30}{2}$

$x = \mathbf{15}$

10. $2x + x + x = 180°$

$4x = 180°$

$\frac{4x}{4} = \frac{180°}{4}$

$x = \mathbf{45°}$

11. $c^2 - b^2 = a^2$

$c^2 - b^2 + b^2 = a^2 + b^2$

$\mathbf{c^2 = a^2 + b^2}$

12. (a) $m\angle a = m\angle h = \mathbf{105°}$

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

(c) $m\angle c = m\angle b = \mathbf{75°}$

(d) $m\angle d = m\angle a = \mathbf{105°}$

13. $F = 1.8C + 32$

$F = 1.8(17) + 32$

$F = 62.6°$

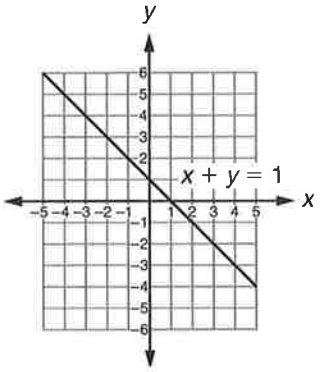
63°F

14. $\frac{45°}{360°} = \frac{1}{8}$

$A \approx \frac{3.14(144 \text{ in.}^2)}{8}$

$A \approx 56.52 \text{ in.}^2 \approx \mathbf{57 \text{ in.}^2}$

15. **See student work;**



16. (a) $\frac{\text{rise}}{\text{run}} = \frac{1}{-1} = \mathbf{-1}$

(b) **(0, 1)**

17. 24 in. = 2 ft; 36 in. = 3 ft

$C \approx 3.14(2 \text{ ft})$

$C \approx 6.28 \text{ ft}$

$A \approx (6.28 \text{ ft})(3 \text{ ft})$

$A \approx \mathbf{18.84 \text{ ft}^2}$

18. Area of base $\approx 3.14(1 \text{ ft}^2)$

$\approx 3.14 \text{ ft}^2$

Volume $\approx (3.14 \text{ ft}^2)(3 \text{ ft})$

$\approx \mathbf{9.42 \text{ ft}^3}$

19. (a) $2x^2 + 1 = 19$

$2x^2 + 1 - 1 = 19 - 1$

$2x^2 = 18$

$\frac{2x^2}{2} = \frac{18}{2}$

$x^2 = 9$

$x = \mathbf{3, -3}$

(b) $2x^2 - 1 = 19$

$2x^2 - 1 + 1 = 19 + 1$

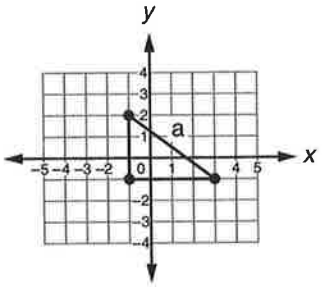
$2x^2 = 20$

$\frac{2x^2}{2} = \frac{20}{2}$

$x^2 = 10$

$x = \sqrt{10}, -\sqrt{10}$

20.



$a^2 = (3 \text{ units})^2 + (4 \text{ units})^2$

$a^2 = 9 \text{ units}^2 + 16 \text{ units}^2$

$a^2 = 25 \text{ units}^2$

$a = 5 \text{ units}$

Perimeter $= 5 \text{ units} + 3 \text{ units} + 4 \text{ units} =$ **12 units**

21.

$$\begin{array}{r} \$5000 \\ \times\ 1.05 \\ \hline \$5250 \\ \times\ 1.05 \\ \hline \$5512.50 \\ \times\ 1.05 \\ \hline \$5788.125 \\ \times\ 1.05 \\ \hline \$6077.53125 \\ \times\ 1.05 \\ \hline \$6381.407813 \end{array} \longrightarrow \textbf{\$6381.41}$$

22. (a) $AB^2 = (15 \text{ cm})^2 + (20 \text{ cm})^2$

$AB^2 = 225 \text{ cm}^2 + 400 \text{ cm}^2$

$AB^2 = 625 \text{ cm}^2$

$AB =$ **25 cm**

(b) $\frac{20 \text{ cm}}{25 \text{ cm}} = \frac{CD}{15 \text{ cm}}$

$(25 \text{ cm})CD = 300 \text{ cm}^2$

$CD =$ **12 cm**

23. (a) $6\overline{)3.6}$ $\quad 0.6 \times 10^2 \longrightarrow$ **6×10^1**

(b) $12\overline{)36}$ $\quad$ **3×10^{-2}**

24. $180° - 140° = 40°$

$180° - (90° + 40°) = 50°$

$m\angle y = 180° - 50° =$ **130°**

25. $5x + 3x = 18 + 2x$

$8x - 2x = 18 + 2x - 2x$

$6x = 18$

$\frac{6x}{6} = \frac{18}{6}$

$x =$ **3**

26. $\frac{3.6}{x} = \frac{4.5}{0.06}$

$4.5x = 0.216$

$\frac{4.5x}{4.5} = \frac{0.216}{4.5}$

$x =$ **0.048**

27. (a) $(-1)^6 + (-1)^5 = 1 + (-1) =$ **0**

(b) $(-10)^6 \div (-10)^5 = (-10)^1 =$ **-10**

28. (a) $\frac{(4a^2b)(9ab^2c)}{6abc}$

$= \frac{\overset{1}{\cancel{2}} \cdot 2 \cdot \overset{1}{\cancel{3}} \cdot 3 \cdot \overset{1}{\cancel{a}} \cdot a \cdot a \cdot \overset{1}{\cancel{b}} \cdot b \cdot b \cdot \overset{1}{\cancel{c}}}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{a}} \cdot \underset{1}{\cancel{b}} \cdot \underset{1}{\cancel{c}}}$

$=$ **$6a^2b^2$**

(b) $x(x - c) + cx$

$x^2 - cx + cx$

x^2

29. $(-3) + (+2)(-4) - (-6)(-2) - (-8)$

$(-3) + (-8) - (12) - (-8)$

-15

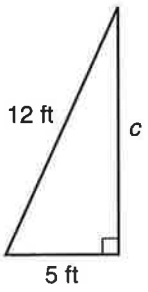
30. $3\frac{1}{3} \cdot 1\frac{4}{5} = \frac{\overset{2}{\cancel{10}}}{\underset{1}{\cancel{3}}} \cdot \frac{\overset{3}{\cancel{9}}}{\underset{1}{\cancel{5}}} = 6$

$6 + 1.5 = 7.5$

$\frac{7.5}{0.03} =$ **250**

LESSON 112, LESSON PRACTICE

a.



$$(5\text{ ft})^2 + c^2 = (12\text{ ft})^2$$
$$25\text{ ft}^2 + c^2 = 144\text{ ft}^2$$
$$25\text{ ft}^2 + c^2 - 25\text{ ft}^2 = 144\text{ ft}^2 - 25\text{ ft}^2$$
$$c^2 = 119\text{ ft}^2$$
$$c = \sqrt{119\text{ ft}^2} \approx 10.9\text{ ft}$$
$$c \approx \textbf{10 feet 11 inches}$$

b. $(AC)^2 = (400\text{ ft})^2 + (300\text{ ft})^2$
$(AC)^2 = 160{,}000\text{ ft}^2 + 90{,}000\text{ ft}^2$
$(AC)^2 = 250{,}000\text{ ft}^2$
$AC = 500$ feet
$(300\text{ feet} + 400\text{ feet}) - 500\text{ feet} = \textbf{200 feet}$

LESSON 112, MIXED PRACTICE

1.
$$\begin{array}{r} \$3000 \\ \times\ 1.08 \\ \hline \$3240 \\ \times\ 1.08 \\ \hline \$3499.20 \\ \times\ 1.08 \\ \hline \$3799.1360 \end{array} \longrightarrow \textbf{\$3799.14}$$

2. $\sqrt{(3)^2 + (4)^2} = \sqrt{9 + 16} = \sqrt{25} = \mathbf{5}$

3. (a) **90**

(b) **95**

4. $\dfrac{840\text{ kilometers}}{10.5\text{ hours}} = \textbf{80 kilometers per hour}$

5.

	Case 1	Case 2
Hours	6	9
Earnings	\$28	e

$$\frac{6}{\$28} = \frac{9}{e}$$
$$6e = \$252$$
$$e = \textbf{\$42}$$

6.

	Percent	Actual Count
Original	100	O
− Change	25	C
New	75	\$48

$$\frac{100}{75} = \frac{O}{\$48}$$
$$75O = \$4800$$
$$O = \textbf{\$64}$$

7.

	Percent	Actual Count
Original	100	\$6
+ Change	25	C
New	125	N

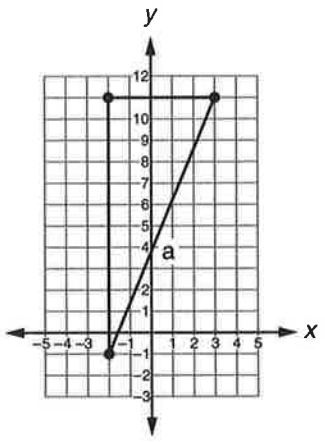
$$\frac{100}{25} = \frac{\$6}{C}$$
$$100C = \$150$$
$$C = \textbf{\$1.50}$$

8. 50% of 50% of \$1.00
$= (0.5)(0.5) \times \$1.00 = 0.25 \times \$1.00$
$= \textbf{\$0.25}$

9. $60\% = \dfrac{60}{100} = \dfrac{6}{10} = \dfrac{3}{5} = \dfrac{\text{boys}}{\text{total}}$

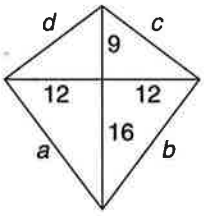
$$\frac{\text{boys}}{\text{girls}} = \frac{\mathbf{3}}{\mathbf{2}}$$

10.



$$a^2 = (12\text{ units})^2 + (5\text{ units})^2$$
$$a^2 = 144\text{ units}^2 + 25\text{ units}^2$$
$$a^2 = 169\text{ units}^2$$
$$a = \textbf{13 units}$$

11.



$$a^2 = (12 \text{ in.})^2 + (16 \text{ in.})^2$$
$$a^2 = 144 \text{ in.}^2 + 256 \text{ in.}^2$$
$$a^2 = 400 \text{ in.}^2$$
$$a = 20 \text{ in.}$$
$$b = a = 20 \text{ in.}$$
$$c^2 = (9 \text{ in.})^2 + (12 \text{ in.})^2$$
$$c^2 = 81 \text{ in.}^2 + 144 \text{ in.}^2$$
$$c^2 = 225 \text{ in.}^2$$
$$c = 15 \text{ in.}$$
$$d = c = 15 \text{ in.}$$
$$\text{Perimeter} = 2(20 \text{ in.}) + 2(15 \text{ in.})$$
$$= 40 \text{ in.} + 30 \text{ in.} = \mathbf{70 \text{ inches}}$$

12. $W_P \times 2.5 = 2$

$$\frac{W_P \times 2.5}{2.5} = \frac{2}{2.5}$$
$$W_P = 0.8$$
$$W_P = 0.8 \times 100\% = \mathbf{80\%}$$

13. $2 \times 2 \times 2 \times 2 = 16$ possible outcomes

1 favorable outcome

15 unfavorable outcomes

Odds = favorable to unfavorable

$= \mathbf{1 \text{ to } 15}$

14.
$$\begin{array}{r} \$4000 \\ \times\ 0.09 \\ \hline \$360 \end{array} \qquad \frac{6}{12} = \frac{1}{2}$$

$$\left(\frac{1}{2}\right)\$360 = \mathbf{\$180}$$

15. (a) **0.625**

(b) **62.5%**

16. (a) $2\overline{)5.0}$ $\quad 2.5$

$\mathbf{2.5 \times 10^4}$

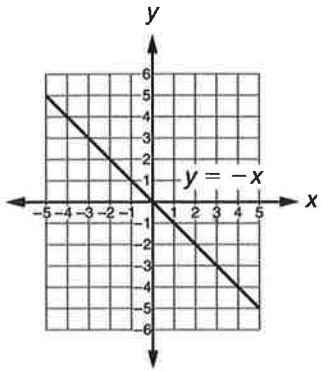
(b) $4\overline{)1.2}$ $\quad 0.3$

$0.3 \times 10^{-4} \longrightarrow \mathbf{3 \times 10^{-5}}$

17. $300 \cancel{\text{kg}} \cdot \dfrac{1000 \text{ g}}{1 \cancel{\text{kg}}} = \mathbf{300{,}000 \text{ g}}$

18.
$$d = rt$$
$$\frac{d}{r} = \frac{rt}{r}$$
$$\boldsymbol{\frac{d}{r} = t}$$

19. **See student work;**



20.
$$C \approx \frac{3.14(20 \text{ cm})}{2}$$
$$C \approx 31.4 \text{ cm}$$
$$\text{Perimeter} \approx 31.4 \text{ cm} + 20 \text{ cm}$$
$$+ 20 \text{ cm} + 20 \text{ cm} \approx \mathbf{91.4 \text{ cm}}$$

21.
$$\text{Area of triangle} = \frac{(9 \text{ ft})(12 \text{ ft})}{2} = 54 \text{ ft}^2$$
$$\text{Area of triangle} = \frac{(9 \text{ ft})(12 \text{ ft})}{2} = 54 \text{ ft}^2$$
$$\text{Area of rectangle} = (10 \text{ ft})(12 \text{ ft}) = 120 \text{ ft}^2$$
$$\text{Area of rectangle} = (10 \text{ ft})(15 \text{ ft}) = 150 \text{ ft}^2$$
$$+ \text{ Area of rectangle} = (10 \text{ ft})(9 \text{ ft}) = 90 \text{ ft}^2$$
$$\text{Total surface area} = \mathbf{468 \text{ ft}^2}$$

22. (a) $\mathbf{2^{12} \cdot 5^{12}}$

(b) **1,000,000**

23. (a)
$$\frac{x}{9} = \frac{8}{12}$$
$$12x = 72$$
$$x = \mathbf{6 \text{ cm}}$$

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

24.
$$\frac{16}{2.5} = \frac{48}{f}$$
$$16f = 120$$
$$f = \mathbf{7.5}$$

25. $2\frac{2}{3}x - 3 = 21$

$$2\frac{2}{3}x - 3 + 3 = 21 + 3$$

$$2\frac{2}{3}x = 24$$

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

$$x = \mathbf{9}$$

26. $10^2 - [10 - 10(10^0 - 10^{-1})]$

$$100 - \left[10 - 10\left(1 - \frac{1}{10}\right)\right]$$

$$100 - \left[10 - 10\left(\frac{9}{10}\right)\right]$$

$$100 - [10 - 9]$$

$$100 - [1]$$

$$\mathbf{99}$$

27. $2\frac{3}{4} - \left(1\frac{1}{2} - \frac{1}{6}\right)$

$$= \frac{11}{4} - \left(\frac{9}{6} - \frac{1}{6}\right) = \frac{11}{4} - \frac{8}{6}$$

$$= \frac{33}{12} - \frac{16}{12} = \frac{17}{12} = \mathbf{1\frac{5}{12}}$$

28. $3\frac{1}{2} \div 1\frac{2}{5} \div 3$

$$= \left(\frac{7}{2} \times \frac{5}{7}\right) \div 3 = \frac{5}{2} \times \frac{1}{3} = \mathbf{\frac{5}{6}}$$

29. $|-4| - (-3)(-2)(-1) + \dfrac{(-5)(4)(-3)(2)}{-1}$

$$4 - (-6) + \frac{(-20)(-6)}{-1}$$

$$4 - (-6) + \frac{120}{-1}$$

$$4 - (-6) - 120$$

$$10 + (-120)$$

$$\mathbf{-110}$$

30. Surface area $= 4\pi r^2$

$$\approx 4\left(\frac{22}{7}\right)(49\text{ cm}^2)$$

$$\approx 4(22)(7\text{ cm}^2)$$

$$\approx 616\text{ cm}^2$$

$$\approx \mathbf{600\text{ cm}^2}$$

LESSON 113, LESSON PRACTICE

a. $\mathbf{\frac{1}{3}}$

b. $\mathbf{\frac{2}{3}}$

c. $\mathbf{\frac{2}{3}}$

d. $\mathbf{\frac{1}{3}}$

e. **All of the box would be filled.** $\left(\frac{1}{3} + \frac{2}{3} = 1\right)$

f. Volume of box $= (12\text{ in.})(12\text{ in.})(12\text{ in.})$

$$= \mathbf{1728\text{ in.}^3}$$

Volume of pyramid $= \frac{1}{3}(1728\text{ in.}^3)$

$$= \mathbf{576\text{ in.}^3}$$

g. Area of base $= \pi(9\text{ in.}^2)$

$$= 9\pi\text{ in.}^2$$

Volume $= \frac{1}{3}(9\pi\text{ in.}^2)(6\text{ in.})$

$$= \mathbf{18\pi\text{ in.}^3}$$

h. Volume $= \frac{4}{3}\pi(3\text{ in.})^3$

$$= \frac{4}{3}\pi(27\text{ in.}^3) = \mathbf{36\pi\text{ in.}^3}$$

LESSON 113, MIXED PRACTICE

1. 75% of 75% of \$24

$= (0.75)(0.75) \times \$24 = \mathbf{\$13.50}$

2.

$$\begin{array}{r} {}^{0}{}^{9}{}^{9}{}^{1} \\ \not{1}\not{0},\not{0}0\ 0,0\ 0\ 0,0\ 0\ 0 \\ -\quad 9\ 8\ 0,0\ 0\ 0,0\ 0\ 0 \\ \hline 9,0\ 2\ 0,0\ 0\ 0,0\ 0\ 0 \end{array}$$

$\mathbf{9.02 \times 10^9}$

3. Mean $= 8.45 \div 5 = 1.69$

Mean $-$ median $= 1.69 - 0.75$

$$= \mathbf{0.94}$$

4. (a) $\dfrac{\$24}{5\text{ hours}} = \mathbf{\$4.80\text{ per hour}}$

(b) $\frac{\$33}{6 \text{ hours}} = \mathbf{\$5.50 \text{ per hour}}$

(c) $\$5.50 - \$4.80 = \mathbf{\$0.70 \text{ more per hour}}$

5.

	Case 1	Case 2
Kilograms	24	42
Cost	\$31	c

$$\frac{24}{\$31} = \frac{42}{c}$$
$$24c = \$1302$$
$$c = \mathbf{\$54.25}$$

6. $\frac{5}{8}(1760 \text{ yards}) = \mathbf{\text{about 1100 yards}}$

7. $P(H, H) = \frac{13}{52} \cdot \frac{13}{52} = \frac{1}{4} \cdot \frac{1}{4} = \mathbf{\frac{1}{16}}$

8. $\mathbf{W_P \times \$30 = \$1.50}$

$$\frac{W_P \times \$30}{\$30} = \frac{\$1.50}{\$30}$$
$$W_P = 0.05$$
$$W_P = 0.05 \times 100\% = \mathbf{5\%}$$

9. $\mathbf{\frac{1}{2} \times W_N = 2\frac{1}{2}}$

$$\frac{2}{1}\left(\frac{1}{2} \times W_N\right) = \left(\frac{2}{1}\right)\frac{5}{2}$$
$$W_N = \mathbf{5}$$

10.

$\$5000 \times 1.08 = \$5400$
$\$5400 \times 1.08 = \$5832$
$\$5832 \times 1.08 = \$6298.56$
$\$6298.56 - \$5000.00 = \mathbf{\$1298.56}$

11.

	Percent	Actual Count
Original	100	\$12
− Change	20	C
New	80	N

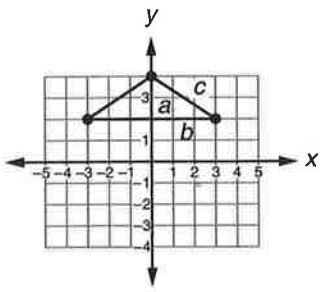
$$\frac{100}{80} = \frac{\$12}{N}$$
$$100N = \$960$$
$$N = \mathbf{\$9.60}$$

12.

	Scale	Actual Size
Model	24	6 ft = 72 in.
Figurine	1	F

$$\frac{24}{1} = \frac{72 \text{ in.}}{F}$$
$$24F = 72 \text{ in.}$$
$$F = \mathbf{3 \text{ inches}}$$

13.



$$A = \frac{(6 \text{ units})(2 \text{ units})}{2} = \mathbf{6 \text{ units}^2}$$

14. $(2 \text{ units})^2 + (3 \text{ units})^2 = c^2$
$4 \text{ units}^2 + 9 \text{ units}^2 = c^2$
$13 \text{ units}^2 = c^2$
$\mathbf{\sqrt{13} \text{ units}} = c$

15. $\text{Volume} \approx \frac{4}{3}(3)(3 \text{ cm})^3$
$\approx \frac{4}{3}(3)(27 \text{ cm}^3)$
$\approx 4(27 \text{ cm}^3)$
$\approx 108 \text{ cm}^3$
$\approx \mathbf{110 \text{ cm}^3}$

16. $(6.3 \times 7) \times (10^6 \times 10^{-3})$
$= 44.1 \times 10^3$
$= \mathbf{4.41 \times 10^4}$

17. $s^2 = (40 \text{ yd})^2 + (30 \text{ yd})^2$
$s^2 = 1600 \text{ yd}^2 + 900 \text{ yd}^2$
$s^2 = 2500 \text{ yd}^2$
$s = 50 \text{ yd}$
$(40 \text{ yd} + 30 \text{ yd}) - 50 \text{ yd} = \mathbf{20 \text{ yards}}$

18. (a) $A = \frac{1}{2}bh$

$$\left(\frac{2}{1}\right)A = \frac{2}{1}\left(\frac{1}{2}bh\right)$$

$$2A = bh$$

$$\frac{2A}{b} = \frac{bh}{b}$$

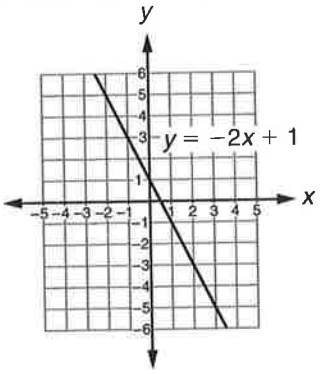
$$\frac{\mathbf{2A}}{\boldsymbol{b}} = \boldsymbol{h}$$

(b) $h = \frac{2(16)}{8}$

$h = 2(2)$

$h = \mathbf{4}$

19. **See student work;**



$\frac{\text{rise}}{\text{run}} = \frac{2}{-1} = \mathbf{-2}$

20. Area of base $= (40\text{ m})(40\text{ m}) = 1600\text{ m}^2$

Volume $= \frac{1}{3}(1600\text{ m}^2)(30\text{ m})$

$= \mathbf{16{,}000\ m^3}$

21. Area of base $\approx 3.14(100\text{ cm}^2) \approx 314\text{ cm}^2$

Volume $\approx \frac{1}{3}(314\text{ cm}^2)(60\text{ cm})$

$\approx \mathbf{6280\ cm^3}$

22. (a) $m\angle D = 180° - (90° + 30°) = \mathbf{60°}$

(b) $m\angle E = m\angle D = \mathbf{60°}$

(c) $m\angle A = m\angle C = \mathbf{30°}$

23. $\frac{4\text{ cm}}{6\text{ cm}} = \frac{8\text{ cm}}{CD}$

$(4\text{ cm})CD = 48\text{ cm}^2$

$CD = \mathbf{12\ cm}$

24. $\frac{7.5}{d} = \frac{25}{16}$

$25d = 120$

$d = \mathbf{4.8}$

25. $1\frac{3}{5}w + 17 = 49$

$1\frac{3}{5}w + 17 - 17 = 49 - 17$

$1\frac{3}{5}w = 32$

$\left(\frac{5}{8}\right)\frac{8}{5}w = \left(\frac{5}{8}\right)32$

$w = \mathbf{20}$

26. $5^2 - \{4^2 - [3^2 - (2^2 - 1^2)]\}$

$25 - \{16 - [9 - (4 - 1)]\}$

$25 - \{16 - [9 - (3)]\}$

$25 - \{16 - [6]\}$

$25 - \{10\}$

15

27. $\frac{\cancel{440}^{22}\text{ yd}}{1\text{ min}} \cdot \frac{1\text{ min}}{\cancel{60}^{20}\text{ s}} \cdot \frac{\cancel{3}^{1}\text{ ft}}{1\text{ yd}} = \mathbf{22\ \frac{ft}{s}}$

28. $1\frac{3}{4} + 2\frac{2}{3} - 3\frac{5}{6}$

$= 1\frac{9}{12} + 2\frac{8}{12} - 3\frac{10}{12} = \mathbf{\frac{7}{12}}$

29. $\left(1\frac{3}{4}\right)\left(2\frac{2}{3}\right) \div 3\frac{5}{6}$

$= \left(\frac{7}{4} \cdot \frac{8}{3}\right) \div \frac{23}{6} = \frac{14}{3} \times \frac{6}{23}$

$= \frac{28}{23} = \mathbf{1\frac{5}{23}}$

30. $(-7) + |-3| - (2)(-3) + (-4) - (-3)(-2)(-1)$

$(-7) + 3 - (-6) + (-4) - (-6)$

$-4 - (-6) + (-4) - (-6)$

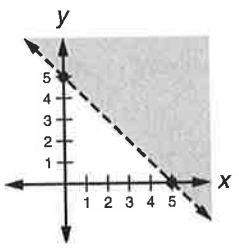
$2 + (-4) - (-6)$

$-2 - (-6)$

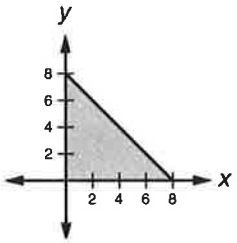
4

LESSON 114, LESSON PRACTICE

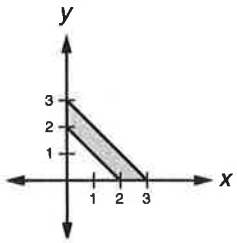
a.



b.



c.



LESSON 114, MIXED PRACTICE

1.

	Percent	Actual Count
Original	100	\$72.50
− Change	20	C
New	80	N

$$\frac{100}{80} = \frac{\$72.50}{N}$$
$$100N = \$5800$$
$$N = \$58$$

$$\begin{array}{r} \$58.00 \\ \times \quad 0.07 \\ \hline \$4.06 \end{array} \qquad \begin{array}{r} \$58.00 \\ + \quad \$4.06 \\ \hline \textbf{\$62.06} \end{array}$$

2. $4(87) = 348$, $6(90) = 540$

$540 - 348 = 192$, $\frac{192}{2} = \mathbf{96}$

3. (a) $P(B) = \frac{12}{27} = \mathbf{\frac{4}{9}}$

(b) $\mathbf{33\frac{1}{3}\%}$

(c) **7 to 2**

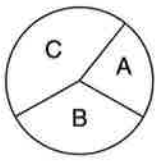
4. $\frac{\$10.80}{144 \text{ pencils}} = \frac{\$0.075}{1 \text{ pencil}}$

$\mathbf{7\frac{1}{2}¢}$ **per pencil**

5.
$$\begin{array}{r} \$5000 \\ \times \quad 0.08 \\ \hline \$400 \end{array}$$

$\frac{6}{12} = \frac{1}{2}$, $\frac{\$400}{2} = \mathbf{\$200}$

6. (a) **Class Test Scores**



(b) $6(4 \text{ students}) = 24 \text{ students}$

$\frac{24 \text{ students}}{3} = 8 \text{ students}$

$24 \text{ students} - (8 \text{ students} + 6 \text{ students})$

$= \mathbf{10 \text{ students}}$

7.

	Ratio	Actual Count
Cars	5	C
Trucks	2	T
Total	7	3500

$$\frac{5}{7} = \frac{C}{3500}$$
$$7C = 17{,}500$$
$$C = \mathbf{2500 \text{ cars}}$$

8. Volume $\approx \frac{4}{3}(3)(2 \text{ ft})^3$

$\approx 4(8 \text{ ft}^3)$

$\approx \mathbf{32 \text{ ft}^3}$

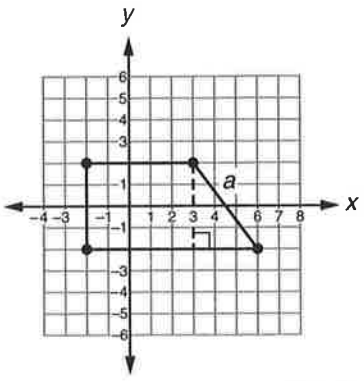
9. $\mathbf{W_N = 1.2 \times \$240}$

$W_N = \mathbf{\$288}$

10. $\mathbf{60 = W_P \times 150}$

$$\frac{60}{150} = \frac{W_P \times 150}{150}$$
$$\frac{2}{5} = W_P$$
$$W_P = \frac{2}{5} \times 100\% = \mathbf{40\%}$$

11.



(a) Area of triangle $= \dfrac{(3 \text{ units})(4 \text{ units})}{2}$

$= 6 \text{ units}^2$

Area of rectangle $= (5 \text{ units})(4 \text{ units})$

$= 20 \text{ units}^2$

Area of figure $= 6 \text{ units}^2 + 20 \text{ units}^2$

$= \mathbf{26 \text{ units}^2}$

(b) $a^2 = (4 \text{ units})^2 + (3 \text{ units})^2$

$a^2 = 16 \text{ units}^2 + 9 \text{ units}^2$

$a^2 = 25 \text{ units}^2$

$a = 5 \text{ units}$

Perimeter $= 5 \text{ units} + 8 \text{ units} + 4 \text{ units} + 5 \text{ units}$

$= \mathbf{22 \text{ units}}$

12. (a) $\mathbf{-6, 0.6, \sqrt{6}, 6^2}$

(b) $\mathbf{6^2, -6, 0.6}$

13. (a) **1.8**

(b) **180%**

14. (a) $2\overline{)5.0}$ $\quad$ $\mathbf{2.5 \times 10^{-3}}$

(b) $5\overline{)2.0}$ $\quad$ $0.4 \times 10^3 \longrightarrow \mathbf{4 \times 10^2}$

15. $10 \times 10^{-1} = \mathbf{1}$

16. $12 \cancel{\text{inches}} \cdot \dfrac{2.54 \text{ centimeters}}{1 \cancel{\text{inch}}}$

$= \mathbf{30.48 \text{ centimeters}}$

17. (a) $C = \pi d$

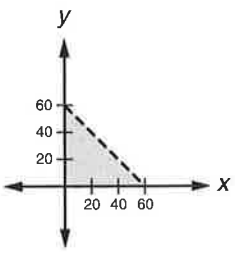
$\dfrac{C}{\pi} = \dfrac{\pi d}{\pi}$

$\dfrac{C}{\pi} = d$

(b) $\dfrac{62.8}{3.14} \approx d$

$\mathbf{20} \approx d$

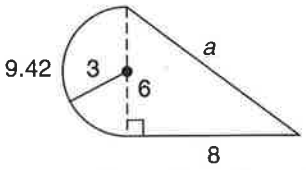
18.



$\mathbf{x + y < 60}$

19. $C \approx \dfrac{3.14(6 \text{ cm})}{2}$

$C \approx 9.42 \text{ cm}$



$a^2 = (6 \text{ cm})^2 + (8 \text{ cm})^2$

$a^2 = 36 \text{ cm}^2 + 64 \text{ cm}^2$

$a^2 = 100 \text{ cm}^2$

$a = 10 \text{ cm}$

Perimeter $\approx 9.42 \text{ cm} + 10 \text{ cm} + 8 \text{ cm}$

$\approx \mathbf{27.42 \text{ cm}}$

20. (a) Surface area $= 6(3 \text{ ft} \times 3 \text{ ft})$

$= 6(9 \text{ ft}^2) = \mathbf{54 \text{ ft}^2}$

(b) Volume $= \dfrac{1}{3}(9 \text{ ft}^2)(3 \text{ ft}) = \mathbf{9 \text{ ft}^3}$

21. Area of base $\approx 3.14(25 \text{ m}^2)$

$\approx 78.5 \text{ m}^2$

Volume $\approx (78.5 \text{ m}^2)(3 \text{ m}) \approx \mathbf{235.5 \text{ m}^3}$

22. (a) $m\angle ACB = 180° - 130° = \mathbf{50°}$

(b) $m\angle CAB = 180° - (90° + 30°) = \mathbf{40°}$

(c) $m\angle CED = m\angle ECD$

$= 180° - 130° = 50°$

$m\angle CDE = 180° - (50° + 50°) = \mathbf{80°}$

23. Volume $= (40 \text{ cm})(10 \text{ cm})(20 \text{ cm})$

$= \mathbf{8000 \text{ cm}^3}$

24. $0.8m - 1.2 = 6$

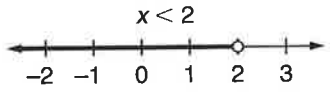
$0.8m - 1.2 + 1.2 = 6 + 1.2$

$0.8m = 7.2$

$\dfrac{0.8m}{0.8} = \dfrac{7.2}{0.8}$

$m = \mathbf{9}$

25.
$$\begin{aligned} 3(x-4) &< x-8 \\ 3x-12 &< x-8 \\ 3x-12+12 &< x-8+12 \\ 3x &< x+4 \\ 3x-x &< x+4-x \\ 2x &< 4 \\ \frac{2x}{2} &< \frac{4}{2} \\ x &< 2 \end{aligned}$$



26. $4^2 \cdot 2^{-3} \cdot 2^{-1} = \cancel{16}^{1} \cdot \frac{1}{\cancel{8}_{1}} \cdot \frac{1}{\cancel{2}_{1}} = \mathbf{1}$

27. 1 kilogram = 1000 grams
1000 grams − 50 grams = **950 grams**

28. $1\frac{2}{10}\left(3\frac{3}{4}\right) \div 4\frac{1}{2} = \left(\frac{\cancel{12}^{3}}{\cancel{10}_{2}} \cdot \frac{\cancel{15}^{3}}{\cancel{4}_{1}}\right) \div \frac{9}{2}$

$$= \frac{\cancel{9}^{1}}{\cancel{2}_{1}} \cdot \frac{\cancel{2}^{1}}{\cancel{9}_{1}} = \mathbf{1}$$

29. $2\frac{3}{4} - 1\frac{1}{2} - \frac{1}{6} = 2\frac{9}{12} - 1\frac{6}{12} - \frac{2}{12}$

$$= \mathbf{1\frac{1}{12}}$$

30.
$$\begin{aligned} &(-3)(-2) - (2)(-3) - (-8) + (-2)(-3) + |-5| \\ &(6) - (-6) - (-8) + (6) + (5) \\ &12 - (-8) + 6 + (5) \\ &20 + 6 + 5 \\ &\mathbf{31} \end{aligned}$$

Lesson 115, Lesson Practice

a. **2 kg or 2000 g**

b. **3000 cm³**

c. **1000 milliliters**

d. Volume = (25 cm)(10 cm)(8 cm)
= 2000 cm³ = 2000 mL
= **2 liters**

Lesson 115, Mixed Practice

1.
$$\begin{array}{r} \$7000 \\ \times\ 0.08 \\ \hline \$560 \end{array}$$

$\frac{9}{12} = \frac{3}{4}$, $\frac{3}{4}(\$560) = \mathbf{\$420}$

2. (a) $P(H, H) = \frac{1}{2} \cdot \frac{1}{2} = \mathbf{\frac{1}{4}}$

(b) **25%**

(c) **1 to 3**

3. 4(410) = 1640
1640 miles + 600 miles = 2240 miles
$\frac{2240 \text{ miles}}{5 \text{ days}} = \mathbf{448\ \frac{mi}{day}}$

4. $\frac{\$2.16}{18 \text{ ounces}} = \frac{\$0.12}{1 \text{ ounce}}$

$\frac{\$3.36}{32 \text{ ounces}} = \frac{\$0.105}{1 \text{ ounce}}$

$$\begin{array}{r} \$0.120 \\ -\ \$0.105 \\ \hline \$0.015 \end{array}$$

$1\frac{1}{2}$¢ more per ounce

5.

	Case 1	Case 2
Words	160	800
Minutes	5	m

$\frac{160}{5} = \frac{800}{m}$
$160m = 4000$
$m =$ **25 minutes**

6.

	Ratio	Actual Count
Guinea pigs	7	G
Rats	5	R
Total	12	120

$\frac{7}{12} = \frac{G}{120}$
$12G = 840$
$G =$ **70 guinea pigs**

7. $\frac{3}{4}x = 48$

$\left(\frac{4}{3}\right)\frac{3}{4}x = \left(\frac{4}{3}\right)48$

$x = 64$

$\frac{5}{8}(64) =$ **40**

8.

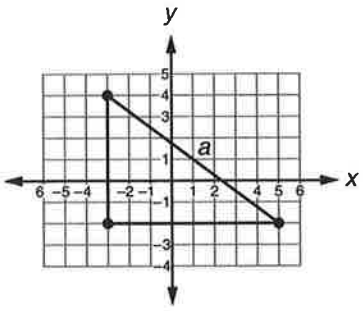
	Percent	Actual Count
Original	100	\$1500
+ Change	40	C
New	140	N

$$\frac{100}{140} = \frac{\$1500}{N}$$
$$100N = \$210{,}000$$
$$N = \$2100$$

$$\begin{array}{r} \$2100 \\ \times \quad 0.08 \\ \hline \$168 \end{array} \qquad \begin{array}{r} \$2100 \\ + \quad \$168 \\ \hline \mathbf{\$2268} \end{array}$$

9. 80% of 75% of \$80 $= (0.8)(0.75) \times \$80$
$= \mathbf{\$48}$

10.



(a) Area $= \dfrac{(8 \text{ units})(6 \text{ units})}{2} = \mathbf{24 \text{ units}^2}$

(b) $a^2 = 64 \text{ units}^2 + 36 \text{ units}^2$
$a^2 = 100 \text{ units}^2$
$a = 10 \text{ units}$
Perimeter $= 10 \text{ units} + 8 \text{ units}$
$+ 6 \text{ units} = \mathbf{24 \text{ units}}$

11. Volume $= (25 \text{ cm})(20 \text{ cm})(10 \text{ cm})$
$= 5000 \text{ cm}^3 = 5000 \text{ g} = 5 \text{ kg}$
$5 \text{ kg} + 5 \text{ kg} = \mathbf{10 \text{ kg}}$

12. (a) $\mathbf{\frac{7}{8}}$

(b) $\mathbf{87\frac{1}{2}\%}$

13. $a \div b \Leftarrow a - b$

14. (a) $(6.4 \times 10^6)(8 \times 10^{-8})$
51.2×10^{-2}
$(5.12 \times 10^1) \times 10^{-2}$
$\mathbf{5.12 \times 10^{-1}}$

(b) $\dfrac{6.4 \times 10^6}{8 \times 10^{-8}}$

$8\overline{)6.4}$ $\quad 0.8$

$10^6 \div 10^{-8} = 10^{14} \longleftarrow [6 - (-8) = 14]$

0.8×10^{14}

$(8 \times 10^{-1}) \times 10^{14}$

8×10^{13}

15. $\mathbf{36 \cancel{\text{inches}} \cdot \dfrac{2.54 \text{ centimeters}}{1 \cancel{\text{inch}}}}$
$\mathbf{= 91.44 \text{ centimeters}}$

16. (a) $A = \frac{1}{2}bh$

$\left(\frac{2}{1}\right)A = \left(\frac{2}{1}\right)\frac{1}{2}bh$

$2A = bh$

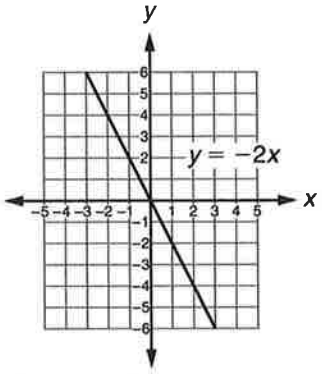
$\frac{2A}{h} = \frac{bh}{h}$

$\frac{2A}{h} = b$

(b) $\frac{2(24)}{6} = b$

$\mathbf{8} = b$

17. **See student work;**



$\frac{\text{rise}}{\text{run}} = \frac{2}{-1} = \mathbf{-2}$

18. $A \approx \dfrac{3.14(4 \text{ mm}^2)}{2}$

$A \approx 6.28 \text{ mm}^2$

Area of square $= (6 \text{ mm})(6 \text{ mm})$
$= 36 \text{ mm}^2$
$-$ Area of semicircle $\approx 6.28 \text{ mm}^2$
Area of figure $\approx \mathbf{29.72 \text{ mm}^2}$

19. (a) $6(100\text{ cm} \times 100\text{ cm})$
$= 6(10{,}000\text{ cm}^2) = \mathbf{60{,}000\text{ cm}^2}$

(b) Volume $= (100\text{ cm})(100\text{ cm})(100\text{ cm})$
$= \mathbf{1{,}000{,}000\text{ cm}^3}$

(c) **1 m**

20. (a) Area of base $= \pi(15\text{ in.})^2$
$= 225\pi\text{ in.}^2$
Volume $= (225\pi\text{ in.}^2)(30\text{ in.})$
$= \mathbf{6750\pi\text{ in.}^3}$

(b) Volume $= \frac{4}{3}\pi(15\text{ in.})^3$
$= \mathbf{4500\pi\text{ in.}^3}$

21. (a) $m\angle YXZ = 180° - (90° + 35°) = \mathbf{55°}$

(b) $m\angle WXV = 180° - (90° + 55°) = \mathbf{35°}$

(c) $m\angle WVX = 180° - (90° + 35°) = \mathbf{55°}$

22. $\frac{21}{14} = \frac{12}{WV}$
$21(WV) = 168$
$WV = \mathbf{8\text{ cm}}$

23. Volume $= \frac{1}{3}(6\text{ in.} \times 6\text{ in.} \times 6\text{ in.})$
$= \mathbf{72\text{ in.}^3}$

24. $0.4n + 5.2 = 12$
$0.4n + 5.2 - 5.2 = 12 - 5.2$
$0.4n = 6.8$
$\frac{0.4n}{0.4} = \frac{6.8}{0.4}$
$n = \mathbf{17}$

25. $\frac{18}{y} = \frac{36}{28}$
$36y = 504$
$\frac{36y}{36} = \frac{504}{36}$
$y = \mathbf{14}$

26. $\sqrt{5^2 - 3^2} + \sqrt{5^2 - 4^2}$
$= \sqrt{25 - 9} + \sqrt{25 - 16} = \sqrt{16} + \sqrt{9}$
$= 4 + 3 = \mathbf{7}$

27.
$$\begin{array}{r} \overset{2}{\cancel{3}}\text{ yd } (\overset{2}{\cancel{3}}\text{ ft}) \quad (12\text{ in.}) \\ -\quad 2\text{ ft} \quad 1\text{ in.} \end{array} \longrightarrow$$

$$\begin{array}{r} \overset{2}{\cancel{3}}\text{ yd } \overset{2}{\cancel{3}}\text{ ft} \quad 12\text{ in.} \\ -\quad 2\text{ ft} \quad 1\text{ in.} \\ \hline \mathbf{2\text{ yd}} \quad \mathbf{11\text{ in.}} \end{array}$$

28. $3\frac{1}{2} \div \left(1\frac{2}{5} \div 3\right)$
$= \frac{7}{2} \div \left(\frac{7}{5} \times \frac{1}{3}\right) = \frac{7}{2} \div \frac{7}{15}$
$= \frac{\overset{1}{\cancel{7}}}{2} \times \frac{15}{\underset{1}{\cancel{7}}} = \frac{15}{2} = \mathbf{7\frac{1}{2}}$ or **7.5**

29. $3.5 + 2^{-2} - 2^{-3} = 3\frac{1}{2} + \frac{1}{4} - \frac{1}{8}$
$= 3\frac{4}{8} + \frac{2}{8} - \frac{1}{8} = \mathbf{3\frac{5}{8}}$ or **3.625**

30.
$\frac{(3)(-2)(4)}{(-6)(2)} + (-8) + (-4)(+5) - (2)(-3)$
$\frac{(-6)(4)}{-12} + (-8) + (-20) - (-6)$
$\frac{-24}{-12} + (-8) + (-20) - (-6)$
$2 + (-8) + (-20) - (-6)$
$-6 + (-20) - (-6)$
$\mathbf{-20}$

LESSON 116, LESSON PRACTICE

a. $8m^2n = \mathbf{(2)(2)(2)}mmn$

b. $12mn^2 = \mathbf{(2)(2)(3)}mnn$

c. $18x^3y^2 = \mathbf{(2)(3)(3)}xxxyy$

d. $\frac{8m^2n}{4mn} + \frac{12mn^2}{4mn}$
$2m + 3n$
$\mathbf{4mn(2m + 3n)}$

e. $\frac{8xy^2}{4xy} - \frac{4xy}{4xy}$
$2y - 1$
$\mathbf{4xy(2y - 1)}$

f. $\frac{6a^2b^3}{3a^2b^2} + \frac{9a^3b^2}{3a^2b^2} + \frac{3a^2b^2}{3a^2b^2}$
$2b + 3a + 1$
$\mathbf{3a^2b^2(2b + 3a + 1)}$