LESSON 106, LESSON PRACTICE

a.
$$a + b = c$$
$$a + b - b = c - b$$
$$\boldsymbol{a = c - b}$$

b.
$$wx = y$$
$$\frac{wx}{x} = \frac{y}{x}$$
$$\boldsymbol{w = \frac{y}{x}}$$

c.
$$y - b = mx$$
$$y - b + b = mx + b$$
$$\boldsymbol{y = mx + b}$$

d.
$$A = bh$$
$$\frac{A}{h} = \frac{bh}{h}$$
$$\boldsymbol{\frac{A}{h} = b}$$

LESSON 106, MIXED PRACTICE

1.
$$\begin{array}{r} \$1.85 \\ \$1.85 \\ \$1.85 \\ +\ \$8.95 \\ \hline \$14.50 \end{array} \qquad \begin{array}{r} \$14.50 \\ \times\ \ 0.06 \\ \hline \$0.87 \end{array} \qquad \begin{array}{r} \$14.50 \\ +\ \$0.87 \\ \hline \$15.37 \end{array}$$

$$\begin{array}{r} \$20.00 \\ -\ \$15.37 \\ \hline \mathbf{\$4.63} \end{array}$$

2. (a) **1 to 2**

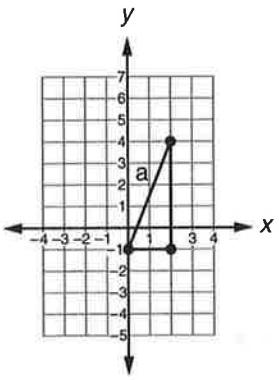
(b) **25%**

3. $\frac{\$2.80}{16 \text{ ounces}} =$ **17.5¢ per ounce**

4. $6(90) = 540,\ 540 - 75 = 465$

$\frac{465}{5} =$ **93**

5.



$a^2 = (2 \text{ units})^2 + (5 \text{ units})^2$

$a^2 = 4 \text{ units}^2 + 25 \text{ units}^2$

$a^2 = 29 \text{ units}^2$

$a =$ **$\sqrt{29}$ units**

6.

	Case 1	Case 2
Problems	3	27
Minutes	4	m

$\frac{3}{4} = \frac{27}{m}$

$3m = 108$

$m =$ **36 minutes**

7.

	Ratio	Actual Count
Residents	2	R
Visitors	3	V
Total	5	60

$\frac{3}{5} = \frac{V}{60}$

$5V = 180$

$V =$ **36 visitors**

8.

	Percent	Actual Count
Original	100	O
+ Change	25	C
New	125	80

$\frac{100}{125} = \frac{O}{80}$

$125O = 8000$

$O =$ **64 students**

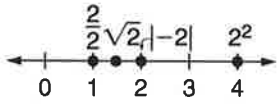
9. (a) **8 and −8**

(b) $\sqrt[3]{-64} = \sqrt[3]{(-4)(-4)(-4)} =$ **−4**

10. $W_N =$ **2.25 × 40**

$W_N =$ **90**

11. (a)



(b) $|-2|, \frac{2}{2}, 2^2$

12. $66 = \frac{2}{3} \times W_N$

$\left(\frac{3}{2}\right)66 = \left(\frac{3}{2}\right)\frac{2}{3} \times W_N$

$99 = W_N$

13. $0.75 \times W_N = 2.4$

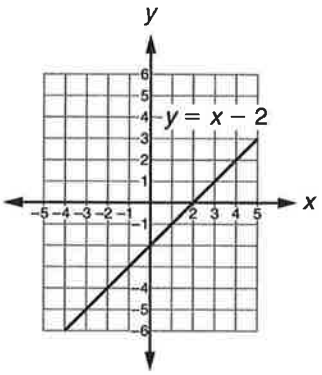
$\frac{0.75 \times W_N}{0.75} = \frac{2.4}{0.75}$

$W_N = 3.2$

14. (a) $1\frac{1}{20}$

(b) **1.05**

15. **See student work;**



16. $0.0833\ldots \rightarrow$ **0.083**

$81\overline{)6.7500}$

$\underline{648}$

270

$\underline{243}$

270

$\underline{243}$

27

17. $(4.8 \times 6) \times (10^{-10} \times 10^{-6})$

$= 28.8 \times 10^{-16}$

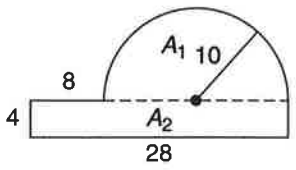
$= \mathbf{2.88 \times 10^{-15}}$

18. $(-3)^2 + (-5)(-3) + (6)$

$9 + (15) + 6$

30

19.



$A_1 \approx \frac{(3.14)(100\ \text{mm}^2)}{2}$

$A_1 \approx 157\ \text{mm}^2$

$A_2 = (4\ \text{mm})(28\ \text{mm}) = 112\ \text{mm}^2$

$A_1 + A_2 \approx 157\ \text{mm}^2 + 112\ \text{mm}^2 \approx$ **269 mm²**

20. Area of triangle $= \frac{(4\ \text{cm})(3\ \text{cm})}{2} = 6\ \text{cm}^2$

Area of triangle $= \frac{(4\ \text{cm})(3\ \text{cm})}{2} = 6\ \text{cm}^2$

Area of rectangle $= (10\ \text{cm})(5\ \text{cm}) = 50\ \text{cm}^2$

Area of rectangle $= (10\ \text{cm})(4\ \text{cm}) = 40\ \text{cm}^2$

$+$ Area of rectangle $= (10\ \text{cm})(3\ \text{cm}) = 30\ \text{cm}^2$

Total surface area $=$ **132 cm²**

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

Volume $\approx (3.14\ \text{in.}^2)(10\ \text{in.})$

$\approx$ **31.4 in.³**

22. $180° - 140° = 40°$

$180° - (90° + 40°) = 50°$

$m\angle b = 180° - (90° + 50°) = \mathbf{40°}$

23. (a) $x + c = d$

$x + c - c = d - c$

$\boldsymbol{x = d - c}$

(b) $an = b$

$\frac{an}{a} = \frac{b}{a}$

$\boldsymbol{n = \frac{b}{a}}$

24. $6w - 2(4 + w) = w + 7$

$6w - 8 - 2w = w + 7$

$4w - 8 = w + 7$

$4w - 8 - w = w + 7 - w$

$3w - 8 = 7$

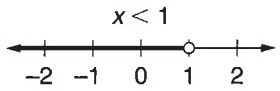
$3w - 8 + 8 = 7 + 8$

$3w = 15$

$\frac{3w}{3} = \frac{15}{3}$

$w = \mathbf{5}$

25.
$$\begin{aligned} 6x + 8 &< 14 \\ 6x + 8 - 8 &< 14 - 8 \\ 6x &< 6 \\ \frac{6x}{6} &< \frac{6}{6} \\ x &< 1 \end{aligned}$$



26. $37 = 3x - 5$, $42 = 3x$, $x = \mathbf{14}$

27. $25 - [3^2 + 2(5 - 3)] = 25 - [9 + 4]$
$= 25 - 13 = \mathbf{12}$

28.
$$\frac{6x^2 + (5x)(2x)}{4x}$$
$$\frac{6x^2 + 10x^2}{4x}$$
$$\frac{16x^2}{4x}$$
$$\frac{\overset{1}{\cancel{4}} \cdot 4 \cdot \overset{1}{\cancel{x}} \cdot x}{\underset{1}{\cancel{4}} \cdot \underset{1}{\cancel{x}}} = \mathbf{4x}$$

29. $4^0 + 3^{-1} + 2^{-2}$
$$1 + \frac{1}{3} + \frac{1}{4} = \frac{12}{12} + \frac{4}{12} + \frac{3}{12} = \frac{19}{12}$$
$$= \mathbf{1\frac{7}{12}}$$

30.
$$(-3)(-2)(+4)(-1) + (-3)^2$$
$$+ \sqrt[3]{-64} - (-2)^3$$
$$(6)(+4)(-1) + (-3)(-3)$$
$$+ \sqrt[3]{(-4)(-4)(-4)} - (-2)(-2)(-2)$$
$$-24 + (9) + (-4) - (-8)$$
$$\mathbf{-11}$$

LESSON 107, LESSON PRACTICE

a. **"Yards to feet":** $\frac{\text{rise}}{\text{run}} = \frac{3}{1} = \mathbf{3}$

"Feet to yards": $\frac{\text{rise}}{\text{run}} = \mathbf{\frac{1}{3}}$

b. Graph (a): $\frac{\text{rise}}{\text{run}} = \frac{1}{1} = \mathbf{1}$

Graph (c): $\frac{\text{rise}}{\text{run}} = \frac{1}{-2} = \mathbf{-\frac{1}{2}}$

c. $\frac{\text{rise}}{\text{run}} = \mathbf{\frac{1}{3}}$

$\frac{\text{rise}}{\text{run}} = \frac{2}{-3} = \mathbf{-\frac{2}{3}}$

$\frac{\text{rise}}{\text{run}} = \mathbf{0}$

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

d. $\mathbf{\frac{1}{3}; -\frac{2}{3}; 0; -2}$

LESSON 107, MIXED PRACTICE

1. $\frac{2}{3} \times \$21 = \mathbf{\$14}$

2.
$$\begin{array}{r} \overset{0}{\not{1}}, \overset{9}{\not{0}}\ \overset{9}{\not{0}}\overset{1}{\not{0}}0{,}000{,}000{,}000 \\ -\quad 9\ 7\ 5{,}000{,}000{,}000 \\ \hline 2\ 5{,}000{,}000{,}000 \end{array}$$
$\mathbf{2.5 \times 10^{10}}$

3. (a) **11**

(b) **16**

4.

	Case 1	Case 2
Miles	18	m
Minutes	60	40

$\frac{18}{60} = \frac{m}{40}$
$60m = 720$
$m = \mathbf{12 \text{ miles}}$

5.

	Ratio	Actual Count
Earthworms	5	E
Cutworms	2	C
Total	7	140

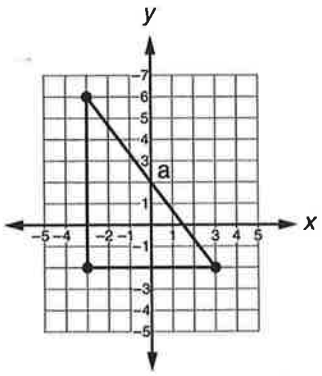
$\frac{5}{7} = \frac{E}{140}$
$7E = 700$
$E = \mathbf{100 \text{ earthworms}}$

6.

	Percent	Actual Count
Original	100	\$16,550
+ Change	8	C
New	108	N

$\frac{100}{108} = \frac{\$16{,}550}{N}$
$100N = \$1{,}787{,}400$
$N = \mathbf{\$17{,}874}$

7.



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

8. (a) $m\angle ABD = 180° - (90° + 50°) = \mathbf{40°}$

(b) $m\angle DBC = 90° - 40° = \mathbf{50°}$

(c) $m\angle BCD = 180° - (90° + 50°) = \mathbf{40°}$

(d) **All three triangles are similar.**

9. $\mathbf{60 = 1.25 \times W_N}$

$$\frac{60}{1.25} = \frac{1.25 \times W_N}{1.25}$$
$$\mathbf{48} = W_N$$

10. $\mathbf{60 = W_P \times 25}$

$$\frac{60}{25} = \frac{W_P \times 25}{25}$$
$$\frac{12}{5} = W_P$$
$$W_P = \frac{12}{5} \times 100\% = \mathbf{240\%}$$

11. $\mathbf{60 = 2n + 4}$

$$60 - 4 = 2n + 4 - 4$$
$$56 = 2n$$
$$\frac{56}{2} = \frac{2n}{2}$$
$$\mathbf{28} = n$$

12. (a) $\dfrac{\text{not red marbles}}{\text{total marbles}} = \dfrac{\mathbf{80}}{\mathbf{100}} = \mathbf{80\%}$

(b) $p(y, y) = \dfrac{\mathbf{10}}{\mathbf{100}} \cdot \dfrac{\mathbf{9}}{\mathbf{99}} = \dfrac{90}{9900} = \dfrac{\mathbf{1}}{\mathbf{110}}$

13. (a) $\mathbf{0.8\overline{3}}$

(b) $\mathbf{83\frac{1}{3}\%}$

14. $(x - y)^2 \ominus (y - x)^2$

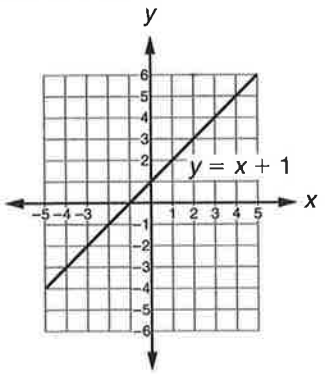
15. $(1.8 \times 9) \times (10^{10} \times 10^{-6})$
$= 16.2 \times 10^4$
$= \mathbf{1.62 \times 10^5}$

16. (a) **24 and 25**

(b) $\mathbf{\sqrt{10}}$ **and** $\mathbf{-\sqrt{10}}$

17. **See student work;**

(a)



(b) $\dfrac{\text{rise}}{\text{run}} = \dfrac{1}{1} = \mathbf{1}$

18. $360° - 120° = 240°, \dfrac{240°}{360°} = \dfrac{2}{3}$

$$A = \frac{2\pi(36 \text{ cm}^2)}{3}$$
$$A = \mathbf{24\pi \text{ cm}^2}$$

19.

Area of square	=	(4 in.)(4 in.)	= 16 in.^{2}
Area of square	=	(4 in.)(4 in.)	= 16 in.^{2}
Area of rectangle	=	(4 in.)(8 in.)	= 32 in.^{2}
Area of rectangle	=	(4 in.)(8 in.)	= 32 in.^{2}
Area of rectangle	=	(4 in.)(8 in.)	= 32 in.^{2}
+ Area of rectangle	=	(4 in.)(8 in.)	= 32 in.^{2}
Total surface area			= **160 in.^{2}**

20. Area of base $\approx 3.14(16 \text{ cm}^2)$
$\approx 50.24 \text{ cm}^2$
Volume $\approx (50.24 \text{ cm}^2)(10 \text{ cm})$
$\approx \mathbf{502.4 \text{ cm}^3}$

21. $C \approx 3.14(8 \text{ cm})$
$C \approx 25.12 \text{ cm}$

Area of lateral surface	=	(25.12 cm)(10 cm)
	=	251.2 cm^2
Area of base	=	50.24 cm^2
+ Area of top	=	50.24 cm^2
Total surface area	=	**351.68 cm^2**

22. $180° - (90° + 60°) = 30°$
$90° - 30° = 60°$
$180° - (90° + 50°) = \mathbf{30°} = m\angle X$

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

24. (a) $x - y = z$
$x - y + y = z + y$
$\boldsymbol{x = z + y}$

(b) $w = xy$
$\frac{w}{y} = \frac{xy}{y}$
$\boldsymbol{\frac{w}{y} = x}$

25. $\frac{a}{21} = \frac{1.5}{7}$
$7a = 31.5$
$\frac{7a}{7} = \frac{31.5}{7}$
$a = \mathbf{4.5}$

26. $6x + 5 = 7 + 2x$
$6x + 5 - 2x = 7 + 2x - 2x$
$4x + 5 = 7$
$4x + 5 - 5 = 7 - 5$
$4x = 2$
$\frac{4x}{4} = \frac{2}{4}$
$x = \mathbf{\frac{1}{2}}$

27. $62 + 5\{20 - [4^2 + 3(2 - 1)]\}$
$62 + 5\{20 - [16 + 3(1)]\}$
$62 + 5\{20 - [19]\}$
$62 + 5\{1\}$
$62 + (5)$
$\mathbf{67}$

28. $\frac{(6x^2y)(2xy)}{4xy^2} = \frac{\overset{1}{\cancel{2}} \cdot 3 \cdot \overset{1}{\cancel{x}} \cdot x \cdot \overset{1}{\cancel{y}} \cdot \overset{1}{\cancel{2}} \cdot x \cdot \overset{1}{\cancel{y}}}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{y}} \cdot \underset{1}{\cancel{y}}}$
$= \mathbf{3x^2}$

29. $5\frac{1}{6} + 3\frac{1}{2} - \frac{1}{3} = 5\frac{1}{6} + 3\frac{3}{6} - \frac{2}{6}$
$= 8\frac{4}{6} - \frac{2}{6} = 8\frac{2}{6} = \mathbf{8\frac{1}{3}}$

30. $\frac{(5)(-3)(2)(-4) + (-2)(-3)}{|-6|}$
$\frac{(-30)(-4) + (6)}{6}$
$\frac{120 + 6}{6}$
$\mathbf{21}$

Lesson 108, Lesson Practice

a. $20 = b(4)$
$\frac{20}{4} = b$
$\mathbf{5} = b$

b. $20 = \frac{1}{2}(b)(4)$
$20 = 2b$
$\frac{20}{2} = b$
$\mathbf{10} = b$

c. $F = 1.8(-40) + 32$
$F = \mathbf{-40}$

Lesson 108, Mixed Practice

1.
$$\begin{array}{r} \$8.35 \\ \$1.25 \\ +\ \$2.40 \\ \hline \$12.00 \end{array} \qquad \begin{array}{r} \$12.00 \\ \times\ \ 0.15 \\ \hline \mathbf{\$1.80} \end{array}$$

2.
$$\begin{array}{r} 0.000120 \\ -\ 0.000020 \\ \hline 0.000100 \end{array} \qquad \mathbf{1 \times 10^{-4}}$$

3. **4, 7, 8, 8, 8, 9, 9, 10, 12, 15**
Median = 8.5
Mode = 8

4. $p(5, 5) = \mathbf{\frac{4}{52} \cdot \frac{3}{51} = \frac{1}{221}}$

5.

	Case 1	Case 2
Dollars	\$200	d
Francs	300	240

$\frac{\$200}{300} = \frac{d}{240}$
$300d = \$48{,}000$
$d = \mathbf{\$160}$

6.

	Ratio	Actual Count
Red beans	5	175
Brown beans	7	B
Total	12	T

$$\frac{5}{12} = \frac{175}{T}$$
$$5T = 2100$$
$$T = \textbf{420 beans}$$

7.

	Percent	Actual Count
Original	100	\$90
− Change	35	C
New	65	N

$$\frac{100}{65} = \frac{\$90}{N}$$
$$100N = \$5850$$
$$N = \$58.50$$
$$2(\$58.50) = \textbf{\$117}$$

8. 1 ton = 2000 pounds

$$\frac{3}{8}(2000 \text{ pounds}) = \textbf{750 pounds}$$

9. $W_N = 0.025 \times 800$

$W_N = \textbf{20}$

10. $0.1 \times W_N = \$2500$

$$\frac{0.1 \times W_N}{0.1} = \frac{\$2500}{0.1}$$
$$W_N = \textbf{\$25,000}$$

11. $56 = 2x - 8$

$56 + 8 = 2x - 8 + 8$

$64 = 2x$

$\frac{64}{2} = \frac{2x}{2}$

$32 = x$

12. $\frac{\text{rise}}{\text{run}} = \frac{2}{-3} = \textbf{-}\frac{\textbf{2}}{\textbf{3}}$

13. (a)

	Scale	Measure
Model	1	$6/7\frac{1}{2}$
Object	24	O_1/O_2

$$\frac{1}{24} = \frac{6}{O_1} \qquad \frac{1}{24} = \frac{7.5}{O_2}$$
$$O_1 = 144 \qquad O_2 = 180$$
$$O_1 = 12 \text{ ft} \qquad O_2 = 15 \text{ ft}$$
$$12 \text{ ft} \times 15 \text{ ft} = \textbf{180 ft}^2$$

(b) **9 in.; We round 17 ft 9 $\frac{1}{2}$ in. to 18 ft. Since every 2 ft is 1 in. in the floor plan, we estimate by dividing 18 by 2.**

14. $4x = 180°$

$\frac{4x}{4} = \frac{180°}{4}$

$x = 45°$

$2x = 2(45°) = \textbf{90°}$

15. $(2.8 \times 8) \times (10^5 \times 10^{-8})$

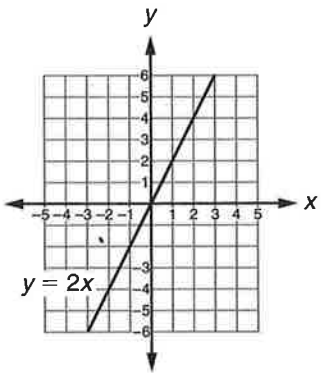
$= 22.4 \times 10^{-3}$

$= \textbf{2.24} \times \textbf{10}^{\textbf{-2}}$

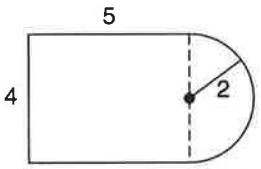
16. $c = 2.54(12)$

$c = \textbf{30.48 cm}$

17. **See student work;**



18.



$$C \approx \frac{3.14(4 \text{ in.})}{2}$$
$$C \approx 6.28 \text{ in.}$$
$$\text{Perimeter} \approx 4 \text{ in.} + 5 \text{ in.} + 6.28 \text{ in.} + 5 \text{ in.} \approx \textbf{20.28 in.}$$

19. $6(100 \text{ in.}^2) = \textbf{600 in.}^2$

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

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

Volume $\approx (78.5 \text{ cm}^2)(5 \text{ cm}) \approx \textbf{392.5 cm}^3$

21. $m\angle x = 180° - 150° = \textbf{30°}$

22. (a) $\frac{y}{10} = \frac{9}{6}$

$6y = 90$

$y = \mathbf{15\ cm}$

(b) $6f = 9$

$f = \frac{9}{6}$

$f = 1\frac{1}{2} = \mathbf{1.5}$

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

23. $x^2 + (6\text{ cm})^2 = (10\text{ cm})^2$

$x^2 + 36\text{ cm}^2 = 100\text{ cm}^2$

$x^2 + 36\text{ cm}^2 - 36\text{ cm}^2 = 100\text{ cm}^2 - 36\text{ cm}^2$

$x^2 = 64\text{ cm}^2$

$x = \mathbf{8\ cm}$

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

$\approx 4(3.14)(25\text{ in.}^2)$

$\approx \mathbf{314\ in.^2}$

25. $1\frac{2}{3}x = 32 - x$

$1\frac{2}{3}x + x = 32 - x + x$

$2\frac{2}{3}x = 32$

$\left(\frac{3}{8}\right)\left(\frac{8}{3}x\right) = \left(\frac{3}{8}\right)32$

$x = \mathbf{12}$

26. $x^2 + x(x + 2)$

$x^2 + x^2 + 2x$

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

27. $\frac{\overset{1}{\cancel{(-2)}} \cdot 2 \cdot a \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{3}} \cdot \overset{1}{\cancel{x}} \cdot y}{\underset{1}{\cancel{(-2)}} \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{x}}}$

$= \mathbf{2ay}$

28. $1.1\{1.1[1.1(1000)]\}$

$1.1\{1.1[1100]\}$

$1.1\{1210\}$

1331

29. $3\frac{3}{4} \cdot 2\frac{2}{3} \div 10$

$= \frac{\overset{5}{\cancel{15}}}{\underset{1}{\cancel{4}}} \cdot \frac{\overset{2}{\cancel{8}}}{\underset{1}{\cancel{3}}} \div \frac{10}{1} = \overset{1}{\cancel{10}} \times \frac{1}{\underset{1}{\cancel{10}}} = 1$

30. (a) $(-6) - (7)(-4) + \sqrt[3]{125} + \frac{(-8)(-9)}{(-3)(-2)}$

$(-6) - (-28) + (5) + \frac{72}{6}$

$22 + (5) + 12$

39

(b) $(-1) + (-1)^2 + (-1)^3 + (-1)^4$

$(-1) + (1) + (-1) + (1)$

0

Lesson 109, Lesson Practice

a. $3x^2 - 8 = 100$

$3x^2 - 8 + 8 = 100 + 8$

$3x^2 = 108$

$x^2 = 36$

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

b. $x^2 + x^2 = 12$

$2x^2 = 12$

$x^2 = 6$

$x = \mathbf{\sqrt{6}, -\sqrt{6}}$

c. $157 = 2(-x)^2 - 5$

$157 = 2x^2 - 5$

$157 + 5 = 2x^2 - 5 + 5$

$162 = 2x^2$

$81 = x^2$

$9, -9 = x$

−9

d. $7x^2 = 21$

$x^2 = 3$

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

$\mathbf{\sqrt{3}}$

e. $\frac{w}{4} = \frac{9}{w}$

$w^2 = 36$

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

Lesson 109, Mixed Practice

1. $\frac{(0.2)(0.05)}{0.2 + 0.05} = \frac{0.01}{0.25} = \mathbf{0.04}$