## LESSON 116, MIXED PRACTICE

**1.** (a) $p(1,4) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

$p(4,1) = \frac{1}{6} \cdot \frac{1}{6} = \frac{1}{36}$

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

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

$4\left(\frac{1}{36}\right) = \frac{1}{9} = 0.\overline{11}$, **0.11**

(b) **25%**

(c) **1 to 35**

**2.** $2^{10}$ bytes = **1024 bytes**

**3.** **The better sale seems to be the "40% of" sale, which is 60% off the regular price. Sixty percent off is better than forty percent off.**

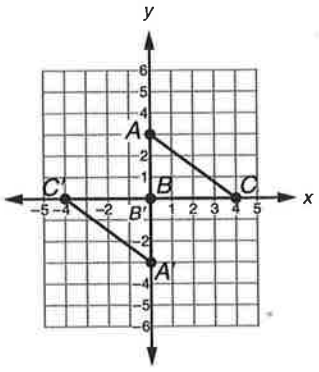
**4.** (a) $\mathbf{1\frac{3}{4}}$

(b) **1.75**

(c) $\mathbf{0.08\overline{3}}$

(d) $\mathbf{8\frac{1}{3}\%}$

**5.**




$A'(0, -3), B'(0, 0), C'(-4, 0)$

**6.** Exterior angle: $\frac{360°}{20} = \mathbf{18°}$

Interior angle: $180° - 18° = \mathbf{162°}$

**7.**

| | Percent | Actual Count |
|---|---|---|
| Original | 100 | $O$ |
| − Change | 30 | $C$ |
| New | 70 | \$42 |

$$\frac{30}{70} = \frac{C}{\$42}$$
$$70C = \$1260$$
$$C = \mathbf{\$18}$$

**8.** (a) Volume = (40 cm)(20 cm)(30 cm)
= 24,000 $cm^3$ = 24,000 mL

24,000 mL = **24 liters**

(b) **24 kg**

**9.** $\mathbf{24\ \cancel{kg} \cdot \frac{2.2\ lb}{1\ \cancel{kg}} = 52.8\ lb}$

**10.** $2x - 6 = 48$

$2x - 6 + 6 = 48 + 6$

$2x = 54$

$\frac{2x}{2} = \frac{54}{2}$

$x = \mathbf{27}$

**11.** $(8x - 8) + (7x + 8) + (6x + 12) = 180$

$21x + 12 = 180$

$21x + 12 - 12 = 180 - 12$

$21x = 168$

$\frac{21x}{21} = \frac{168}{21}$

$x = 8°$

$7(8°) + 8 = \mathbf{64°}$

**12.** $F = 1.8C + 32$

$F - 32 = 1.8C + 32 - 32$

$F - 32 = 1.8C$

$\frac{F - 32}{1.8} = \frac{1.8C}{1.8}$

$\mathbf{\frac{F - 32}{1.8} = C}$

**13.** $C \approx \frac{3.14(40\text{ in.})}{2}$

$C \approx 62.8$ in.

Perimeter $\approx$ 62.8 in. + 66 in. + 66 in.

$\approx$ 194.8 in. $\approx$ **195 in.**

**14.** $a^2 = (15\text{ cm})^2 + (20\text{ cm})^2$
$a^2 = 225\text{ cm}^2 + 400\text{ cm}^2$
$a^2 = 625\text{ cm}^2$
$a = 25\text{ cm}$

$$\begin{aligned}
\text{Area of triangle} &= \frac{(20\text{ cm})(15\text{ cm})}{2} \\
&= 150\text{ cm}^2 \\
\text{Area of triangle} &= \frac{(20\text{ cm})(15\text{ cm})}{2} \\
&= 150\text{ cm}^2 \\
\text{Area of rectangle} &= (20\text{ cm})(20\text{ cm}) \\
&= 400\text{ cm}^2 \\
\text{Area of rectangle} &= (15\text{ cm})(20\text{ cm}) \\
&= 300\text{ cm}^2 \\
+\ \text{Area of rectangle} &= (20\text{ cm})(25\text{ cm}) \\
&= 500\text{ cm}^2 \\
\text{Total surface area} &= \mathbf{1500\text{ cm}^2}
\end{aligned}$$

**15.** Volume $= (150\text{ cm}^2)(20\text{ cm})$
$= \mathbf{3000\text{ cm}^3}$

**16.** (a) $\frac{\text{rise}}{\text{run}} = \frac{1}{1} = \mathbf{1}$;
**(0, −2)**

(b) $\frac{\text{rise}}{\text{run}} = \frac{2}{-1} = \mathbf{-2}$;
**(0, 4)**

**17.** $A = \frac{1}{2}(12\text{ cm} + 18\text{ cm})8\text{ cm}$
$= \frac{1}{2}(30\text{ cm})8\text{ cm}$
$= (15\text{ cm})\,8\text{ cm}$
$= \mathbf{120\text{ cm}^2}$

**18.**
$$\begin{aligned}
3x^2 - 5 &= 40 \\
3x^2 - 5 + 5 &= 40 + 5 \\
3x^2 &= 45 \\
\frac{3x^2}{3} &= \frac{45}{3} \\
x^2 &= 15 \\
x &= \mathbf{\sqrt{15}, -\sqrt{15}}
\end{aligned}$$

**19.** (a) $4\overline{)8}$ $\quad \mathbf{2 \times 10^{-12}}$

(b) $8\overline{)4.0}$ $\quad 0.5 \times 10^{12} \longrightarrow \mathbf{5 \times 10^{11}}$

**20.** **The product is 1 because the numbers are reciprocals.**

**21.** (a) $9x^2y = (3)(3)xxy$

(b) $\frac{10a^2b}{5ab} + \frac{15a^2b^2}{5ab} + \frac{20abc}{5ab}$
$2a + 3ab + 4c$
$\mathbf{5ab(2a + 3ab + 4c)}$

**22.** Volume $\approx \frac{4}{3}(3.14)(6\text{ in.})^3$
$\approx \frac{4}{3}(3.14)(216\text{ in.}^3)$
$\approx 904.32\text{ in.}^3$
$\approx \mathbf{904\text{ in.}^3}$

**23.** (a) $m\angle BCD = 180° - (90° + 25°)$
$= 180° - 115° = \mathbf{65°}$

(b) $m\angle BAC = 180° - (25° + 90°) = \mathbf{65°}$

(c) $m\angle ACD = 180° - (90° + 65°) = \mathbf{25°}$

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

**24.** $\frac{BD}{BC} = \frac{CD}{CA}$

**25.**
$$\begin{aligned}
x - 15 &= x + 2x + 1 \\
x - 15 &= 3x + 1 \\
x - 15 - x &= 3x + 1 - x \\
-15 &= 2x + 1 \\
-15 - 1 &= 2x + 1 - 1 \\
-16 &= 2x \\
\frac{-16}{2} &= \frac{2x}{2} \\
\mathbf{-8} &= x
\end{aligned}$$

**26.**
$$\begin{aligned}
0.12(m - 5) &= 0.96 \\
0.12m - 0.6 &= 0.96 \\
0.12m - 0.6 + 0.6 &= 0.96 + 0.6 \\
0.12m &= 1.56 \\
\frac{0.12m}{0.12} &= \frac{1.56}{0.12} \\
m &= \mathbf{13}
\end{aligned}$$

**27.** $a(b - c) + b(c - a)$
$ab - ac + bc - ba$
$\mathbf{-ac + bc}$ or $\mathbf{bc - ac}$

**28.** $\frac{(8x^2y)(12x^3y^2)}{(4xy)(6y^2)}$

$$\frac{\overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{2}} \cdot 2 \cdot 2 \cdot \overset{1}{\cancel{3}} \cdot \overset{1}{\cancel{x}} \cdot x \cdot x \cdot x \cdot \overset{1}{\cancel{y}} \cdot \overset{1}{\cancel{y}} \cdot \overset{1}{\cancel{y}}}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{y}} \cdot \underset{1}{\cancel{y}} \cdot \underset{1}{\cancel{y}}}$$

$\mathbf{4x^4}$

**29.** (a) $(-3)^2 + (-2)(-3) - (-2)^3$

$9 + (6) - (-8)$

$15 - (-8)$

**23**

(b) $\sqrt[3]{-8} + \sqrt[3]{8} = -2 + 2 = \mathbf{0}$

**30.** $AD$ = 1.2 units − 0.75 unit

= **0.45 unit**

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## Lesson 117, Lesson Practice

**a.**

$2x + y = 3$

$2x + y - 2x = 3 - 2x$

$y = 3 - 2x$

$\boldsymbol{y = -2x + 3}$

**b.**

$y - 3 = x$

$y - 3 + 3 = x + 3$

$\boldsymbol{y = x + 3}$

**c.**

$2x + y - 3 = 0$

$2x + y - 3 + 3 = 0 + 3$

$2x + y = 3$

$2x + y - 2x = 3 - 2x$

$y = 3 - 2x$

$\boldsymbol{y = -2x + 3}$

**d.**

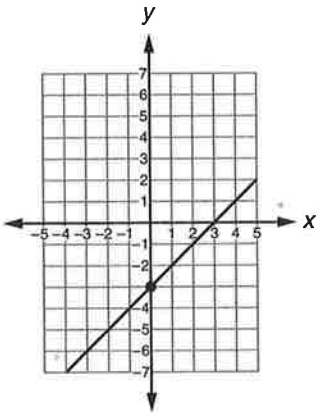
$x + y = 4 - x$

$x + y - x = 4 - x - x$

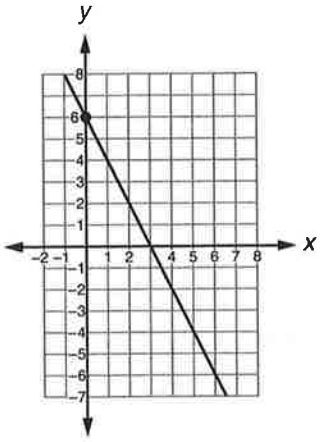
$y = 4 - 2x$

$\boldsymbol{y = -2x + 4}$

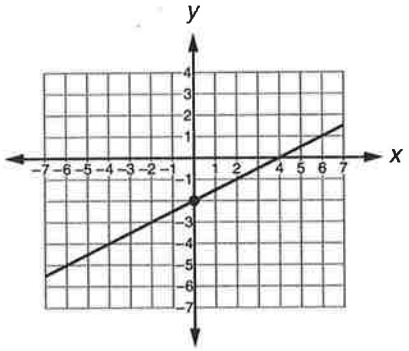
**e.**



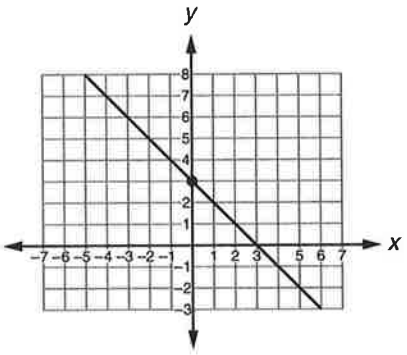

**f.**




**g.**




**h.**




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## Lesson 117, Mixed Practice

**1.**

$$\begin{array}{r} \$10{,}000 \\ \times \quad 1.07 \\ \hline \$10{,}700 \\ \times \quad 1.07 \\ \hline \$11{,}449 \\ \times \quad 1.07 \\ \hline \$12{,}250.43 \\ \times \quad 1.07 \\ \hline \$13{,}107.9601 \end{array}$$

$$\begin{array}{r} \$13{,}107.96 \\ - \ \$10{,}000.00 \\ \hline \mathbf{\$3107.96} \end{array}$$

**2.** (a) $\frac{1}{4}$

(b) **1 to 3**

**3.** $4(75\%) + 6(85\%) = 810\%$

$$\frac{810\%}{10} = \mathbf{81\%}$$

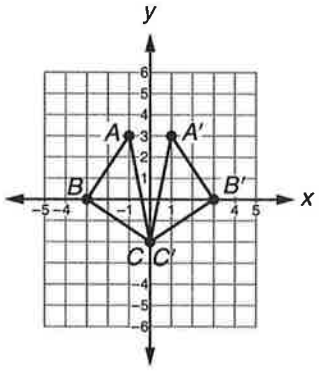
**4.** (a) $\mathbf{1\frac{2}{5}}$

(b) **140%**

(c) $\mathbf{0.9\overline{16}}$

(d) $\mathbf{91\frac{2}{3}\%}$

**5.**




$\boldsymbol{A'(1, 3), B'(3, 0), C'(0, -2)}$

**6.** (a) $\frac{360°}{8} = \mathbf{45°}$

(b) $180° - 45° = \mathbf{135°}$

(c) **5 diagonals**

**7.** $\frac{100}{N} = \frac{1.2}{0.3}$

$1.2N = 30$

$N = \mathbf{25\%}$

**8.** (a) **500 cubic centimeters**

(b) 500 mL = 500 g = **0.5 kilogram**

**9.** $\cancel{540}^{\,60}\ \text{ft}^2 \cdot \frac{1\text{ yd}}{\cancel{3}^{\,1}\ \text{ft}} \cdot \frac{1\text{ yd}}{\cancel{3}^{\,1}\ \text{ft}} = \mathbf{60\ yd^2}$

**10.** $3x^2 + 6 = 81$

$3x^2 + 6 - 6 = 81 - 6$

$3x^2 = 75$

$\frac{3x^2}{3} = \frac{75}{3}$

$x^2 = 25$

$x = \mathbf{5, -5}$

**11.** $(3x + 5) + (x - 5) = 180°$

$4x = 180°$

$\frac{4x}{4} = \frac{180°}{4}$

$x = 45°$

$2x + (x - 5) = 2(45°) + (45° - 5)$

$= 90° + 40° = 130°$

$m\angle y = 180 - 130° = \mathbf{50°}$

**12.** $c^2 - a^2 = b^2$

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

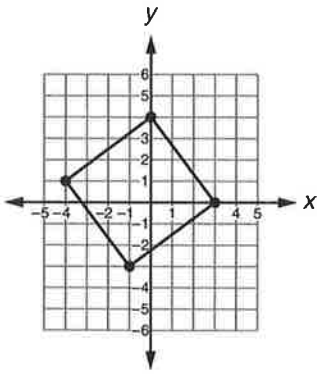
$\boldsymbol{c^2 = b^2 + a^2}$ or $\boldsymbol{c^2 = a^2 + b^2}$

**13.** (a) **0.25**

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

(c) **1 to 5**

**14.**




(a) **5 units**

(b) Perimeter = 4(5 units) = **20 units**

(c) Area = (5 units)(5 units) = **25 units$^2$**

**15.** (a) Area of base = $\pi(3\text{ in.})^2$

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

Volume = $(9\pi\text{ in.}^2)(8\text{ in.})$

$= \mathbf{72\pi\ in.^3}$

(b) Volume = $\frac{1}{3}(72\pi\text{ in.}^3) = \mathbf{24\pi\ in.^3}$

**16.** (a) $V = lwh$

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

$$\frac{V}{lw} = h$$

(b) $$h = \frac{\overset{10}{\cancel{6000}\ \text{cm}^3}}{(\underset{1}{\cancel{20}\ \text{cm}})(\underset{1}{\cancel{30}\ \text{cm}})} = \mathbf{10\ cm}$$

**17.** (a) $\frac{\text{rise}}{\text{run}} = \frac{2}{1} = \mathbf{2}$

(b) **(0, 4)**

(c) $\boldsymbol{y = 2x + 4}$

**18.** (a)
$$y + 5 = x$$
$$y + 5 - 5 = x - 5$$
$$\boldsymbol{y = x - 5}$$

(b)
$$2x + y = 4$$
$$2x + y - 2x = 4 - 2x$$
$$\boldsymbol{y = -2x + 4}$$

**19.** (a) $24xy^2 = \mathbf{(2)(2)(2)(3)}xyy$

(b) $$\frac{3x^2}{3x} + \frac{6xy}{3x} - \frac{9x}{3x}$$
$$x + 2y - 3$$
$$\boldsymbol{3x(x + 2y - 3)}$$

**20.** (a) $(5 \times 10^3\ \text{mm})(5 \times 10^3\ \text{mm})$
$= 25 \times 10^6\ \text{mm}^2$
$= \mathbf{2.5 \times 10^7\ mm^2}$

(b) **25,000,000 mm²**

**21.** $$\overset{25}{\cancel{25{,}000{,}000\ \text{mm}^2}} \cdot \frac{1\ \text{m}}{\underset{1}{\cancel{1000\ \text{mm}}}} \cdot \frac{1\ \text{m}}{\underset{1}{\cancel{1000\ \text{mm}}}}$$

$= \mathbf{25\ m^2}$

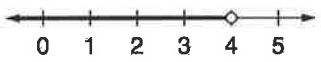
**22.** (a) Side ***BD***

(b) Side ***AD***

**23.** $$\frac{5}{3}\text{ in.} - \frac{5}{4}\text{ in.} = \frac{20}{12}\text{ in.} - \frac{15}{12}\text{ in.} = \mathbf{\frac{5}{12}\ in.}$$

**24.**
$$\frac{3}{4}x + 12 < 15$$
$$\frac{3}{4}x + 12 - 12 < 15 - 12$$
$$\frac{3}{4}x < 3$$
$$\left(\frac{4}{3}\right)\frac{3}{4}x < \left(\frac{4}{3}\right)3$$
$$\boldsymbol{x < 4}$$

$x < 4$




**25.**
$$6w - 3w + 18 = 9(w - 4)$$
$$3w + 18 = 9w - 36$$
$$3w + 18 - 18 = 9w - 36 - 18$$
$$3w = 9w - 54$$
$$3w - 9w = 9w - 54 - 9w$$
$$-6w = -54$$
$$\frac{-6w}{-6} = \frac{-54}{-6}$$
$$w = \mathbf{9}$$

**26.**
$$3x(x - 2y) + 2xy(x + 3)$$
$$3x^2 - 6xy + 2x^2y + 6xy$$
$$\boldsymbol{3x^2 + 2x^2y}$$

**27.**
$$2^{-2} + 4^{-1} + \sqrt[3]{27} + (-1)^3$$
$$= \frac{1}{4} + \frac{1}{4} + 3 + (-1) = \frac{2}{4} + 2$$
$$= \mathbf{2\frac{1}{2}}$$

**28.**
$$(-3) + (-2)[(-3)(-2) - (+4)] - (-3)(-4)$$
$$(-3) + (-2)[(6) - (+4)] - (12)$$
$$(-3) + (-2)[2] - (12)$$
$$(-3) + (-4) - (12)$$
$$\boldsymbol{-19}$$

**29.** $$4\overline{)1.2}\quad \frac{0.3}{}$$

$0.3 \times 10^{-9} \longrightarrow \mathbf{3 \times 10^{-10}}$

**30.**
$$\frac{36a^2b^3c}{12ab^2c}$$
$$\frac{\overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{2}} \cdot \overset{1}{\cancel{3}} \cdot 3 \cdot \overset{1}{\cancel{a}} \cdot a \cdot \overset{1}{\cancel{b}} \cdot \overset{1}{\cancel{b}} \cdot b \cdot \overset{1}{\cancel{c}}}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{3}} \cdot \underset{1}{\cancel{a}} \cdot \underset{1}{\cancel{b}} \cdot \underset{1}{\cancel{b}} \cdot \underset{1}{\cancel{c}}}$$
$$\boldsymbol{3ab}$$

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## LESSON 118, LESSON PRACTICE

**a.** **Answers may vary. See student work.**

**b.** **Answers may vary. See student work.**

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## LESSON 118, MIXED PRACTICE

**1.**
$$\frac{100}{C} = \frac{\$180{,}000}{\$9000}$$
$$\$180{,}000C = \$900{,}000$$
$$C = \mathbf{5\%}$$

**2.** $\frac{40 \text{ cm}}{100 \text{ cm}} = \frac{600 \text{ cm}}{l}$

$(40 \text{ cm})l = 60{,}000 \text{ cm}^2$

$l = 1500 \text{ cm}$

**About 15 meters**

**3.** **Armando can select a Pythagorean triplet like 3-4-5 to verify that he has formed a right angle. For example, he can measure and mark from a corner 3 meters along one line and 4 meters along a proposed perpendicular line. Then he can check to see whether it is 5 meters between the marks.**

**4.** $15 \text{ meters} \cdot \frac{3.28 \text{ feet}}{1 \text{ meter}} \approx 49.2 \text{ feet}$

$\approx$ **49 feet**

**5.** $\frac{1}{120} = \frac{1.5}{x}$

$(1)x = (1.5)(120)$

$x = (1.5)(120)$

$x = 180 \text{ in.} = 15 \text{ ft}$

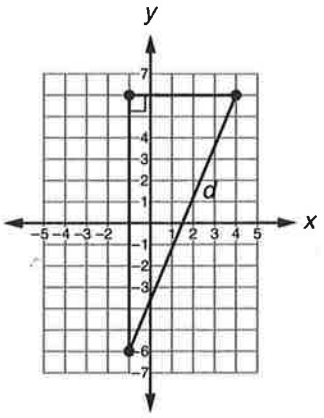
$A = (15 \text{ ft})(15 \text{ ft}) =$ **225 ft²**

**6.** (a) $\mathbf{\frac{1}{9}}$

(b) $\mathbf{8\frac{1}{3}\%}$

(c) **1 to 17**

**7.**




$d^2 = (12 \text{ units})^2 + (5 \text{ units})^2$

$d^2 = 144 \text{ units}^2 + 25 \text{ units}^2$

$d^2 = 169 \text{ units}^2$

$d =$ **13 units**

**8.** (a) $2 \text{ L} = 2000 \text{ mL}$

$=$ **2000 cubic centimeters**

(b) **2 kilograms**

**9.** $\frac{1}{2}x - \frac{2}{3} = \frac{5}{6}$

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

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

$\frac{1}{2}x = \frac{9}{6}$

$\left(\frac{2}{1}\right)\frac{1}{2}x = \left(\frac{2}{1}\right)\left(\frac{9}{6}\right)$

$x = \frac{9}{3} =$ **3**

**10.** $\frac{200°}{2} = 100°$

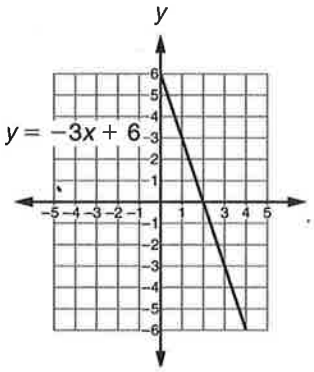
$m\angle g = 180° - 100° =$ **80°**

**11.** $3x + y = 6$

$3x + y - 3x = 6 - 3x$

$y = 6 - 3x$

$y =$ **$-3x + 6$**




**12.** $(x + 30) + 3x + 2x = 180°$

$6x + 30 = 180°$

$6x + 30 - 30 = 180° - 30$

$6x = 150°$

$\frac{6x}{6} = \frac{150°}{6}$

$x = 25°$

$2x = 2(25°) =$ **50°**

**13.** Area of base $= (12 \text{ in.})(12 \text{ in.})$

$= 144 \text{ in.}^2$

Volume of pyramid $= \frac{1}{3}(144 \text{ in.}^2)(8 \text{ in.})$

$= 384 \text{ in.}^3$

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

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

$384 \text{ in.}^3 + 1728 \text{ in.}^3 =$ **2112 cubic inches**

**14.** $AD = c - 12$

**15.** $\frac{x}{20} = \frac{20}{25}$

$25x = 400$

$x = \mathbf{16}$

$y = 25 - 16$

$y = \mathbf{9}$

**16.** $A \approx 4(3)(4\text{ cm})^2$

$\approx (12)(16\text{ cm}^2)$

$\approx \mathbf{192\text{ cm}^2}$

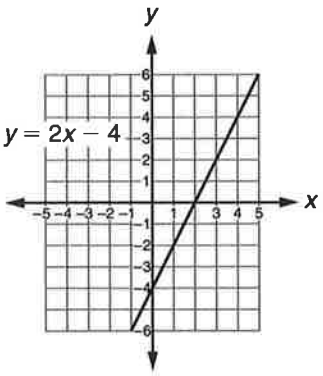
**17.** $y - 2x + 5 = 1$

$y - 2x + 2x + 5 = 1 + 2x$

$y + 5 = 1 + 2x$

$y + 5 - 5 = 1 + 2x - 5$

$\mathbf{y = 2x - 4}$




**18.** (a) $\frac{\text{rise}}{\text{run}} = \mathbf{\frac{1}{2}}$

(b) $\mathbf{-1}$

(c) $\mathbf{y = \frac{1}{2}x - 1}$

**19.** **See student work.**

**20.** $C \approx \frac{\frac{22}{7}(7\text{ in.})}{2}$

$C \approx \frac{22\text{ in.}}{2}$

$C \approx 11\text{ in.}$

Perimeter $\approx 11\text{ in.} + 4\frac{1}{4}\text{ in.} + 4\frac{1}{4}\text{ in.}$

$+ 11\text{ in.} + 2\text{ in.} + 2\text{ in.}$

$\approx 26\text{ in.} + 8\frac{2}{4}\text{ in.} \approx \mathbf{34\frac{1}{2}\text{ in.}}$

**21.** $\frac{1 \times 10^3}{1 \times 10^{-3}} = \mathbf{1 \times 10^6\text{ dimes}}$

**22.** (a) $\frac{x^2}{x} + \frac{x}{x}$

$x + 1$

$\mathbf{x(x + 1)}$

(b) $\frac{12m^2n^3}{6mn^2} + \frac{18mn^2}{6mn^2} - \frac{24m^2n^2}{6mn^2}$

$2mn + 3 - 4m$

$\mathbf{6mn^2(2mn + 3 - 4m)}$

**23.** $-2\frac{2}{3}w - 1\frac{1}{3} = 4$

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

$-2\frac{2}{3}w = 5\frac{1}{3}$

$\left(-\frac{3}{8}\right)\left(-\frac{8}{3}w\right) = \left(-\frac{3}{8}\right)\left(\frac{16}{3}\right)$

$w = \mathbf{-2}$

**24.** $5x^2 + 1 = 81$

$5x^2 + 1 - 1 = 81 - 1$

$5x^2 = 80$

$\frac{5x^2}{5} = \frac{80}{5}$

$x^2 = 16$

$x = \mathbf{4, -4}$

**25.** $\left(\frac{1}{2}\right)^2 - 2^{-2} = \frac{1}{4} - \frac{1}{4} = \mathbf{0}$

**26.** $66\frac{2}{3}\%$ of $\frac{5}{6}$ of 0.144

$= 66\frac{2}{3}\%$ of 0.12

$= (0.66\overline{6})(0.12) = \mathbf{0.08}$ or $\mathbf{\frac{2}{25}}$

**27.** $[-3 + (-4)(-5)] - [-4 - (-5)(-2)]$

$[-3 + (20)] - [-4 - (10)]$

$[17] - [-14]$

**31**

**28.** $\frac{(5x^2yz)(6xy^2z)}{10xyz}$

$\frac{\overset{1}{\cancel{2}} \cdot 3 \cdot \overset{1}{\cancel{5}} \cdot \overset{1}{\cancel{x}} \cdot x \cdot x \cdot \overset{1}{\cancel{y}} \cdot y \cdot y \cdot \overset{1}{\cancel{z}} \cdot z}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{5}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{y}} \cdot \underset{1}{\cancel{z}}}$

$\mathbf{3x^2y^2z}$

**29.** $x(x + 2) + 2(x + 2)$
$x^2 + 2x + 2x + 4$
$\mathbf{x^2 + 4x + 4}$

**30.** $a^2 = (20\text{ mm})^2 + (10\text{ mm})^2$
$a^2 = 500\text{ mm}^2$
$a = \sqrt{500}\text{ mm}$
**22 mm and 23 mm**

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## Lesson 119, Lesson Practice

**a.** **A typical error message display is ERROR. Error messages vary.**

**b.** **$0 \div 0 = 7$ is not a fact, because division by zero is not possible.**

**c.** $\mathbf{w \neq 0}$

**d.** $\mathbf{x \neq 1}$

**e.** $\mathbf{w \neq 0}$

**f.** $\mathbf{y \neq 3}$

**g.** $\mathbf{x \neq 2, -2}$

**h.** $\mathbf{c \neq 0}$

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## Lesson 119, Mixed Practice

**1.** $\frac{2}{50} = \frac{1}{25} = \mathbf{4\%}$

**2.** $\frac{100}{C} = \frac{\$20}{\$5}$
$\$20C = \$500$
$C = \mathbf{25\%}$

**3.**




**4.** **360°**

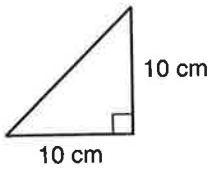
**5.** (a) $\mathbf{\frac{1}{200}}$

(b) **0.005**

(c) $\mathbf{0.\overline{8}}$

(d) $\mathbf{88\frac{8}{9}\%}$

**6.** (a)




(b) **45%**

(c) **14 cm**

**7.** $\frac{(6 \times 10^5)(2 \times 10^6)}{(3 \times 10^4)} = \frac{12 \times 10^{11}}{3 \times 10^4}$

$3\overline{)12}$ $\quad$ $\mathbf{4 \times 10^7}$

**8.** (a) $\frac{2x^2}{x} + \frac{x}{x}$
$2x + 1$
$\mathbf{x(2x + 1)}$

(b) $\frac{3a^2b}{3a} - \frac{12a^2}{3a} + \frac{9ab^2}{3a}$
$ab - 4a + 3b^2$
$\mathbf{3a(ab - 4a + 3b^2)}$

**9.** Volume $= (3\text{ cm}^3) + 6(1\text{ cm}^3) + 9(1\text{ cm}^3)$
$= \mathbf{18\text{ cm}^3}$

**10.** Surface area $= 2(6\text{ cm}^2) + 6(3\text{ cm}^2) + 2(9\text{ cm}^2) = \mathbf{48\text{ cm}^2}$

**11.** $A = \frac{1}{2}bh$

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

$2A = bh$

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

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

$\frac{2(1.44\text{ m}^2)}{1.6\text{ m}} = h$

$\frac{2.88\text{ m}^2}{1.6\text{ m}} = h$

$\mathbf{1.8\text{ m}} = h$

**12.** $\frac{\text{boys}}{\text{total}} = \frac{3}{8} \times 100\% = \mathbf{37\frac{1}{2}\%}$

**13.**
$$\begin{aligned} (6\text{ ft})^2 + h^2 &= (10\text{ ft})^2 \\ 36\text{ ft}^2 + h^2 &= 100\text{ ft}^2 \\ 36\text{ ft}^2 + h^2 - 36\text{ ft}^2 &= 100\text{ ft}^2 - 36\text{ ft}^2 \\ h^2 &= 64\text{ ft}^2 \\ h &= \mathbf{8\text{ ft}} \end{aligned}$$

**14.** (a) $\boldsymbol{y = 2x - 4}$

(b) $\boldsymbol{y = -\frac{1}{2}x + 1}$

**15.** **The product of the slopes is −1. The slopes are negative reciprocals.**

**16.**
$$\begin{array}{r} \$8000 \\ \times\quad 1.06 \\ \hline \$8480 \\ \times\quad 1.06 \\ \hline \$8988.80 \\ \times\quad 1.06 \\ \hline \$9528.1280 \\ \times\quad 1.06 \\ \hline \$10{,}099.81568 \end{array} \longrightarrow \mathbf{\$10{,}099.82}$$

**17.** $1250\ \cancel{\text{sq. ft}} \cdot \frac{1\text{ yd}}{3\ \cancel{\text{ft}}} \cdot \frac{1\text{ yd}}{3\ \cancel{\text{ft}}}$

$\approx$ **139 square yards**

**18.** (a) $\boldsymbol{w \neq 0}$

(b) $\boldsymbol{m \neq -3}$

**19.** $\boldsymbol{DA = c - x}$

**20.**
$$\begin{aligned} \frac{y}{20} &= \frac{15}{25} \\ 25y &= 300 \\ y &= 12\text{ in.} \\ (12\text{ in.})^2 + z^2 &= (15\text{ in.})^2 \\ 144\text{ in.}^2 + z^2 &= 225\text{ in.}^2 \\ 144\text{ in.}^2 + z^2 - 144\text{ in.}^2 &= 225\text{ in.}^2 - 144\text{ in.}^2 \\ z^2 &= 81\text{ in.}^2 \\ z &= 9\text{ in.} \\ \text{Area} &= \frac{(12\text{ in.})(9\text{ in.})}{2} = \mathbf{54\text{ in.}^2} \end{aligned}$$

**21.**
$$\begin{aligned} \text{Volume} &\approx \frac{4}{3}(3.14)(15\text{ cm})^3 \\ &\approx \frac{4}{3}(3.14)(3375\text{ cm}^3) \\ &\approx \mathbf{14{,}130\text{ cm}^3} \end{aligned}$$

**22.** **See student work.**

**23.**
$$\begin{aligned} \frac{2}{3}m + \frac{1}{4} &= \frac{7}{12} \\ \frac{2}{3}m + \frac{1}{4} - \frac{1}{4} &= \frac{7}{12} - \frac{1}{4} \\ \frac{2}{3}m &= \frac{7}{12} - \frac{3}{12} \\ \frac{2}{3}m &= \frac{4}{12} \\ \left(\frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{2}}}\right)\left(\frac{\overset{1}{\cancel{2}}}{\underset{1}{\cancel{3}}}m\right) &= \left(\frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{2}}}\right)\frac{\overset{1}{\cancel{4}}}{\underset{2}{\cancel{12}}} \\ m &= \mathbf{\frac{1}{2}} \end{aligned}$$

**24.**
$$\begin{aligned} 5(3 - x) &= 55 \\ 15 - 5x &= 55 \\ 15 - 5x - 15 &= 55 - 15 \\ -5x &= 40 \\ \frac{-5x}{-5} &= \frac{40}{-5} \\ x &= \mathbf{-8} \end{aligned}$$

**25.**
$$\begin{aligned} x + x + 12 &= 5x \\ 2x + 12 &= 5x \\ 2x + 12 - 12 &= 5x - 12 \\ 2x &= 5x - 12 \\ 2x - 5x &= 5x - 12 - 5x \\ -3x &= -12 \\ \frac{-3x}{-3} &= \frac{-12}{-3} \\ x &= \mathbf{4} \end{aligned}$$

**26.**
$$\begin{aligned} 10x^2 &= 100 \\ \frac{10x^2}{10} &= \frac{100}{10} \\ x^2 &= 10 \\ x &= \mathbf{\sqrt{10}, -\sqrt{10}} \end{aligned}$$

**27.** **300**

**28.**
$$\begin{aligned} x(x + 5) - 2(x + 5) \\ x^2 + 5x - 2x - 10 \\ \mathbf{x^2 + 3x - 10} \end{aligned}$$

**29.** $\dfrac{(12xy^2z)(9x^2y^2z)}{36xyz^2}$

$$\frac{\overset{1}{\cancel{2}}\cdot\overset{1}{\cancel{2}}\cdot\overset{1}{\cancel{3}}\cdot\overset{1}{\cancel{3}}\cdot 3\cdot\overset{1}{\cancel{x}}\cdot x\cdot x\cdot\overset{1}{\cancel{y}}\cdot y\cdot y\cdot y\cdot\overset{1}{\cancel{z}}\cdot\overset{1}{\cancel{z}}}{\underset{1}{\cancel{2}}\cdot\underset{1}{\cancel{2}}\cdot\underset{1}{\cancel{3}}\cdot\underset{1}{\cancel{3}}\cdot\underset{1}{\cancel{x}}\cdot\underset{1}{\cancel{x}}\cdot\underset{1}{\cancel{y}}\cdot\underset{1}{\cancel{z}}\cdot\underset{1}{\cancel{z}}}$$

$3x^2y^3$

**30.** $33\frac{1}{3}\%$ of 0.12 of $3\frac{1}{3}$

$$= \left(\frac{1}{3}\right) \times \left(\frac{\overset{4}{\cancel{12}}}{\underset{10}{\cancel{100}}} \cdot \frac{\overset{1}{\cancel{10}}}{\underset{1}{\cancel{3}}}\right)$$

$$= \frac{1}{3} \times \frac{4}{10} = \mathbf{\frac{2}{15}} \text{ or } \mathbf{0.1\overline{3}}$$

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## Lesson 120, Lesson Practice

**a.** **See student work.**

**b.** **See student work.**

**c.** **See student work.**

**d.** **See student work.**

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## Lesson 120, Mixed Practice

**1.** $P(\text{sum of 7}) = \frac{1}{6}$; **1 to 5**

**2.** $\frac{\$2.70}{1.08} = \mathbf{\$2.50}$

**3.** **Insufficient information**

**4.** **100°; 80°; 80°**

**5.** (a) $\mathbf{\frac{1}{1000}}$

(b) **0.001**

(c) **1.6**

(d) **160%**

**6.** (a)
$$a^2 + (1\text{ cm})^2 = (2\text{ cm})^2$$
$$a^2 + 1\text{ cm}^2 = 4\text{ cm}^2$$
$$a^2 + 1\text{ cm}^2 - 1\text{ cm}^2 = 4\text{ cm}^2 - 1\text{ cm}^2$$
$$a^2 = 3\text{ cm}^2$$
$$a = \mathbf{\sqrt{3}\text{ cm}}$$

(b) **1.7 cm**

**7.** $\dfrac{(4 \times 10^{-5})(6 \times 10^{-4})}{8 \times 10^3} = \dfrac{24 \times 10^{-9}}{8 \times 10^3}$

$8\overline{)24}$ $\quad \mathbf{3 \times 10^{-12}}$

**8.** (a) $\dfrac{3y^2}{y} - \dfrac{y}{y}$

$3y - 1$

$\mathbf{y(3y - 1)}$

(b) $\dfrac{6w^2}{3w} + \dfrac{9wx}{3w} - \dfrac{12w}{3w}$

$2w + 3x - 4$

$\mathbf{3w(2w + 3x - 4)}$

**9.** $\mathbf{\frac{1}{3}}$

**10.** $C \approx (3.14)(6\text{ cm})$

$C \approx 18.84\text{ cm}$

$A \approx (18.84\text{ cm})(6\text{ cm})$

$\approx 113.04\text{ cm}^2 \approx \mathbf{113\text{ cm}^2}$

**11.** $E = mc^2$

$\dfrac{E}{c^2} = \dfrac{mc^2}{c^2}$

$\mathbf{\dfrac{E}{c^2} = m}$

**12.** $\dfrac{60}{100} = \dfrac{3}{5} = \dfrac{\text{girls}}{\text{total}}$

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

**13.** line $m$: $\mathbf{y = -\frac{2}{3}x + 2}$

line $n$: $\mathbf{y = \frac{3}{2}x - 2}$

**14.** **The product of the slopes is −1. The slopes are negative reciprocals.**

**15.**
$$\left.\begin{array}{r}\$1000\\ \times\ 1.2\\ \hline \$1200\end{array}\right\}\ \text{Year 1}$$
$$\left.\begin{array}{r}\times\ 1.2\\ \hline \$1440\end{array}\right\}\ \text{Year 2}$$
$$\left.\begin{array}{r}\times\ 1.2\\ \hline \$1728\end{array}\right\}\ \text{Year 3}$$
$$\left.\begin{array}{r}\times\ 1.2\\ \hline \$2073.60\end{array}\right\}\ \text{Year 4}$$

**About 4 years**

**16.** $d^2 = (17 \text{ in.})^2 + (12 \text{ in.})^2$
$d^2 = 289 \text{ in.}^2 + 144 \text{ in.}^2$
$d^2 = 433 \text{ in.}^2$
$d = \sqrt{433 \text{ in.}^2}$
$d \approx$ **21 in.**

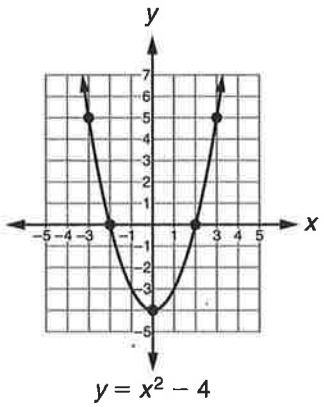
**17.** (a) Volume $= (36 \text{ feet})(21 \text{ feet})\left(\frac{1}{2} \text{ feet}\right)$
$=$ **378 cubic feet**

(b) $\overset{14}{\cancel{378}}\,\text{ft}^3 \cdot \frac{1 \text{ yd}}{\overset{1}{\cancel{3}}\,\text{ft}} \cdot \frac{1 \text{ yd}}{\overset{1}{\cancel{3}}\,\text{ft}} \cdot \frac{1 \text{ yd}}{\overset{1}{\cancel{3}}\,\text{ft}}$
$=$ **14 cubic yards**

**18.** (a) $m \neq 2$

(b) $y \neq -5$

**19.**




$y = x^2 - 4$

**20.** $\frac{c}{a} = \frac{a}{y}$

**21.** Surface area $\approx 4(3.14)(3 \text{ in.})^2$
$\approx 4(3.14)(9 \text{ in.}^2)$
$\approx 113.04 \text{ in.}^2$
$\approx$ **113 in.$^2$**

**22.** 250 cubic centimeters $= 250$ mL $=$ **0.25 liter**

**23.** $15 + x = 3x - 17$
$15 + x - 3x = 3x - 17 - 3x$
$15 - 2x = -17$
$15 - 2x - 15 = -17 - 15$
$-2x = -32$
$\frac{-2x}{-2} = \frac{-32}{-2}$
$x =$ **16**

**24.** $3\frac{1}{3}x - 16 = 74$
$3\frac{1}{3}x - 16 + 16 = 74 + 16$
$3\frac{1}{3}x = 90$
$\left(\frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{10}}}\right)\left(\frac{\overset{1}{\cancel{10}}}{\underset{1}{\cancel{3}}}x\right) = \left(\frac{3}{\underset{1}{\cancel{10}}}\right)\overset{9}{\cancel{90}}$
$x =$ **27**

**25.** $\frac{m^2}{4} = 9$
$m^2 = 36$
$m =$ **6, −6**

**26.** $\frac{1.2}{m} = \frac{0.04}{8}$
$0.04m = 9.6$
$\frac{0.04m}{0.04} = \frac{9.6}{0.04}$
$m =$ **240**

**27.** $x(x - 5) - 2(x - 5)$
$x^2 - 5x - 2x + 10$
$\mathbf{x^2 - 7x + 10}$

**28.** $\frac{(3xy)(4x^2y)(5x^2y^2)}{10x^3y^3}$
$\frac{\overset{1}{\cancel{2}} \cdot 2 \cdot 3 \cdot \overset{1}{\cancel{5}} \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{x}} \cdot \overset{1}{\cancel{x}} \cdot x \cdot x \cdot \overset{1}{\cancel{y}} \cdot \overset{1}{\cancel{y}} \cdot \overset{1}{\cancel{y}} \cdot y}{\underset{1}{\cancel{2}} \cdot \underset{1}{\cancel{5}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{x}} \cdot \underset{1}{\cancel{y}} \cdot \underset{1}{\cancel{y}} \cdot \underset{1}{\cancel{y}}}$
$\mathbf{6x^2y}$

**29.** $|-8| + 3(-7) - [(-4)(-5) - 3(-2)]$
$8 + (-21) - [(20) - (-6)]$
$8 + (-21) - [26]$
$\mathbf{-39}$

**30.** $\frac{7\frac{1}{2} - \frac{2}{3}(0.9)}{0.03} = \frac{7\frac{1}{2} - \frac{\overset{1}{\cancel{2}}}{\overset{1}{\cancel{3}}}\left(\frac{\overset{3}{\cancel{9}}}{\underset{5}{\cancel{10}}}\right)}{0.03}$
$= \frac{7\frac{1}{2} - \frac{3}{5}}{0.03} = \frac{7\frac{5}{10} - \frac{6}{10}}{0.03}$
$= \frac{6\frac{15}{10} - \frac{6}{10}}{0.03} = \frac{6\frac{9}{10}}{0.03}$
$= \frac{6.9}{0.03} =$ **230**