

What is a Proportion?

State whether or not each pair of ratios forms a proportion.

- | | | |
|--|---|---|
| 1. $\frac{6}{12} \stackrel{?}{=} \frac{12}{14}$ _____ | 2. $\frac{3}{20} \stackrel{?}{=} \frac{2}{10}$ _____ | 3. $\frac{20}{12} \stackrel{?}{=} \frac{25}{15}$ _____ |
| 4. $\frac{27}{6} \stackrel{?}{=} \frac{36}{8}$ _____ | 5. $\frac{13}{11} \stackrel{?}{=} \frac{24}{20}$ _____ | 6. $\frac{3}{4} \stackrel{?}{=} \frac{15}{20}$ _____ |
| 7. $\frac{10}{4} \stackrel{?}{=} \frac{45}{20}$ _____ | 8. $\frac{15}{10} \stackrel{?}{=} \frac{3}{2}$ _____ | 9. $\frac{12}{21} \stackrel{?}{=} \frac{16}{28}$ _____ |
| 10. $\frac{3}{24} \stackrel{?}{=} \frac{4}{32}$ _____ | 11. $\frac{12}{20} \stackrel{?}{=} \frac{4}{7}$ _____ | 12. $\frac{2}{9} \stackrel{?}{=} \frac{5}{22}$ _____ |
| 13. $\frac{6}{15} \stackrel{?}{=} \frac{4}{12}$ _____ | 14. $\frac{15}{18} \stackrel{?}{=} \frac{20}{24}$ _____ | 15. $\frac{17}{12} \stackrel{?}{=} \frac{10}{7}$ _____ |
| 16. $\frac{25}{35} \stackrel{?}{=} \frac{15}{21}$ _____ | 17. $\frac{10}{9} \stackrel{?}{=} \frac{16}{14}$ _____ | 18. $\frac{32}{36} \stackrel{?}{=} \frac{40}{45}$ _____ |
| 19. $\frac{2 \text{ tsp}}{7 \text{ gal}} \stackrel{?}{=} \frac{6 \text{ tsp}}{21 \text{ gal}}$ _____ | 20. $\frac{12 \text{ cm}}{20 \text{ g}} \stackrel{?}{=} \frac{15 \text{ g}}{25 \text{ cm}}$ _____ | 21. $\frac{\$14}{3 \text{ hr}} \stackrel{?}{=} \frac{\$84}{18 \text{ hr}}$ _____ |
| 22. $\frac{27 \text{ lb}}{\$21} \stackrel{?}{=} \frac{14 \text{ lb}}{\$18}$ _____ | 23. $\frac{15 \text{ sec}}{21 \text{ sec}} \stackrel{?}{=} \frac{10 \text{ in.}}{15 \text{ in.}}$ _____ | 24. $\frac{6 \text{ ft}}{13 \text{ gal}} \stackrel{?}{=} \frac{7 \text{ ft}}{14 \text{ gal}}$ _____ |

For Exercises 25–30, choose the proportion that is written correctly.

- | | | |
|--|--|--|
| 25. a. $\frac{20 \text{ men}}{25 \text{ women}} = \frac{5 \text{ men}}{4 \text{ women}}$ | b. $\frac{20 \text{ men}}{25 \text{ women}} = \frac{4 \text{ men}}{5 \text{ women}}$ | c. $\frac{4 \text{ men}}{5 \text{ women}} = \frac{25 \text{ women}}{20 \text{ men}}$ |
| 26. a. $\frac{27 \text{ acres}}{\$15} = \frac{\$25}{45 \text{ acres}}$ | b. $\frac{\$27}{15 \text{ acres}} = \frac{\$25}{45 \text{ acres}}$ | c. $\frac{45 \text{ acres}}{\$25} = \frac{27 \text{ acres}}{\$15}$ |
| 27. a. $\frac{12 \text{ pies}}{4 \text{ cakes}} = \frac{6 \text{ cakes}}{18 \text{ pies}}$ | b. $\frac{4 \text{ cakes}}{12 \text{ pies}} = \frac{6 \text{ cakes}}{18 \text{ pies}}$ | c. $\frac{12 \text{ pies}}{4 \text{ cakes}} = \frac{6 \text{ pies}}{18 \text{ cakes}}$ |
| 28. a. $\frac{6 \text{ gal}}{15 \text{ gal}} = \frac{2 \text{ min}}{5 \text{ min}}$ | b. $\frac{5 \text{ min}}{15 \text{ gal}} = \frac{6 \text{ gal}}{2 \text{ min}}$ | c. $\frac{6 \text{ gal}}{2 \text{ min}} = \frac{5 \text{ gal}}{15 \text{ min}}$ |
| 29. a. $\frac{25 \text{ chairs}}{5 \text{ tables}} = \frac{10 \text{ tables}}{2 \text{ chairs}}$ | b. $\frac{25 \text{ chairs}}{5 \text{ tables}} = \frac{2 \text{ tables}}{10 \text{ chairs}}$ | c. $\frac{25 \text{ chairs}}{5 \text{ tables}} = \frac{10 \text{ chairs}}{2 \text{ tables}}$ |
| 30. a. $\frac{36 \text{ lb}}{28 \text{ ft}} = \frac{18 \text{ lb}}{14 \text{ ft}}$ | b. $\frac{18 \text{ lb}}{14 \text{ ft}} = \frac{28 \text{ lb}}{36 \text{ ft}}$ | c. $\frac{36 \text{ ft}}{28 \text{ lb}} = \frac{18 \text{ lb}}{14 \text{ ft}}$ |

31. During the butterfly stroke competitions at the 1972 Summer Olympic Games, Mayumi Aoki swam 100 meters in 64 seconds, and Karen Moe swam 200 meters in 136 seconds. Do these rates form a proportion? _____

32. At Deliah's Hardware, you can buy 5 feet of PVC pipe for \$1.10, or 8 feet for \$1.76. Are these prices proportional? _____

Solving Proportions Using Cross Products

Solve each proportion.

1. $\frac{12}{a} = \frac{16}{20}$

$a = \underline{\hspace{2cm}}$

2. $\frac{2}{8} = \frac{t}{20}$

$t = \underline{\hspace{2cm}}$

3. $\frac{30}{a} = \frac{20}{18}$

$a = \underline{\hspace{2cm}}$

4. $\frac{45}{x} = \frac{18}{8}$

$x = \underline{\hspace{2cm}}$

5. $\frac{u}{5} = \frac{6}{3}$

$u = \underline{\hspace{2cm}}$

6. $\frac{15}{5} = \frac{6}{a}$

$a = \underline{\hspace{2cm}}$

7. $\frac{m}{8} = \frac{12}{16}$

$m = \underline{\hspace{2cm}}$

8. $\frac{40}{y} = \frac{16}{2}$

$y = \underline{\hspace{2cm}}$

9. $\frac{16}{36} = \frac{g}{45}$

$g = \underline{\hspace{2cm}}$

10. $\frac{s}{28} = \frac{30}{21}$

$s = \underline{\hspace{2cm}}$

11. $\frac{4}{5} = \frac{8}{d}$

$d = \underline{\hspace{2cm}}$

12. $\frac{15}{5} = \frac{12}{c}$

$c = \underline{\hspace{2cm}}$

13. $\frac{16}{28} = \frac{h}{7}$

$h = \underline{\hspace{2cm}}$

14. $\frac{2}{k} = \frac{3}{6}$

$k = \underline{\hspace{2cm}}$

15. $\frac{30}{3} = \frac{j}{2}$

$j = \underline{\hspace{2cm}}$

16. $\frac{3}{r} = \frac{2}{8}$

$r = \underline{\hspace{2cm}}$

17. $\frac{20}{8} = \frac{f}{2}$

$f = \underline{\hspace{2cm}}$

18. $\frac{2}{20} = \frac{z}{10}$

$z = \underline{\hspace{2cm}}$

19. $\frac{20}{d} = \frac{4}{5}$

$d = \underline{\hspace{2cm}}$

20. $\frac{4}{q} = \frac{2}{7}$

$q = \underline{\hspace{2cm}}$

21. $\frac{z}{15} = \frac{2}{6}$

$z = \underline{\hspace{2cm}}$

22. $\frac{2}{3} = \frac{b}{6}$

$b = \underline{\hspace{2cm}}$

23. $\frac{y}{2} = \frac{6}{4}$

$y = \underline{\hspace{2cm}}$

24. $\frac{2}{5} = \frac{4}{n}$

$n = \underline{\hspace{2cm}}$

25. $\frac{10}{m} = \frac{8}{4}$

$m = \underline{\hspace{2cm}}$

26. $\frac{27}{6} = \frac{j}{8}$

$j = \underline{\hspace{2cm}}$

27. $\frac{g}{3.5} = \frac{1.6}{1.4}$

$g = \underline{\hspace{2cm}}$

28. $\frac{8}{36} = \frac{p}{9}$

$p = \underline{\hspace{2cm}}$

29. $\frac{14}{16} = \frac{28}{p}$

$p = \underline{\hspace{2cm}}$

30. $\frac{t}{24} = \frac{10}{16}$

$t = \underline{\hspace{2cm}}$

31. $\frac{45}{u} = \frac{27}{12}$

$u = \underline{\hspace{2cm}}$

32. $\frac{10}{45} = \frac{2}{x}$

$x = \underline{\hspace{2cm}}$

33. $\frac{25}{q} = \frac{15}{12}$

$q = \underline{\hspace{2cm}}$

34. $\frac{15}{20} = \frac{v}{4}$

$v = \underline{\hspace{2cm}}$

35. $\frac{p}{6} = \frac{3}{2}$

$p = \underline{\hspace{2cm}}$

36. $\frac{3}{7} = \frac{12}{a}$

$a = \underline{\hspace{2cm}}$

37. **Measurement** If 5 pints of water weigh 80 oz, find the weight of 12 pints of water. _____

38. In 1967, a minimum wage worker would receive \$84 for 60 hours of work. How much would the worker receive for 75 hours of work? _____

Solving Proportions Using Unit Rates

Find the unit rate for each.

- | | | |
|---|---|--|
| 1. $\frac{12 \text{ books}}{3 \text{ shelves}}$ _____ | 2. $\frac{14 \text{ tsp}}{7 \text{ gal}}$ _____ | 3. $\frac{108 \text{ pages}}{9 \text{ hours}}$ _____ |
| 4. $\frac{6 \text{ gal}}{2 \text{ min}}$ _____ | 5. $\frac{30.48 \text{ cm}}{12 \text{ in.}}$ _____ | 6. $\frac{40 \text{ mice}}{8 \text{ rats}}$ _____ |
| 7. $\frac{28 \text{ cats}}{4 \text{ dogs}}$ _____ | 8. $\frac{\$315}{35 \text{ hr}}$ _____ | 9. $\frac{10 \text{ CDs}}{5 \text{ tapes}}$ _____ |
| 10. $\frac{90 \text{ cars}}{15 \text{ trucks}}$ _____ | 11. $\frac{14 \text{ cups}}{42 \text{ sec}}$ _____ | 12. $\frac{18 \text{ boys}}{18 \text{ girls}}$ _____ |
| 13. $\frac{576 \text{ pt}}{72 \text{ gal}}$ _____ | 14. $\frac{120 \text{ mi}}{3 \text{ hr}}$ _____ | 15. $\frac{35 \text{ carrots}}{10 \text{ potatoes}}$ _____ |
| 16. $\frac{36 \text{ cups}}{18 \text{ bowls}}$ _____ | 17. $\frac{68 \text{ men}}{17 \text{ women}}$ _____ | 18. $\frac{375 \text{ ft}^2}{25 \text{ people}}$ _____ |

Solve each proportion using unit rates.

- | | | |
|--|---|---|
| 19. $\frac{\text{_____}}{20 \text{ moose}} = \frac{14 \text{ cows}}{10 \text{ moose}}$ | 20. $\frac{25 \text{ pt}}{10 \text{ ft}^2} = \frac{\text{_____}}{8 \text{ ft}^2}$ | 21. $\frac{7 \text{ hits}}{2 \text{ innings}} = \frac{\text{_____}}{6 \text{ innings}}$ |
| 22. $\frac{4 \text{ ft}}{12 \text{ sec}} = \frac{\text{_____}}{6 \text{ sec}}$ | 23. $\frac{\$15}{9 \text{ lb}} = \frac{\text{_____}}{3 \text{ lb}}$ | 24. $\frac{15 \text{ meals}}{3 \text{ days}} = \frac{\text{_____}}{5 \text{ days}}$ |
| 25. $\frac{5 \text{ drops}}{50 \text{ gal}} = \frac{\text{_____}}{30 \text{ gal}}$ | 26. $\frac{\text{_____}}{2 \text{ hr}} = \frac{15^\circ}{3 \text{ hr}}$ | 27. $\frac{\text{_____}}{4 \text{ hr}} = \frac{16 \text{ gal}}{2 \text{ hr}}$ |
| 28. $\frac{45 \text{ in.}}{5 \text{ lb}} = \frac{\text{_____}}{2 \text{ lb}}$ | 29. $\frac{12 \text{ lb}}{4 \text{ sec}} = \frac{\text{_____}}{1 \text{ sec}}$ | 30. $\frac{\$6}{2 \text{ hr}} = \frac{\text{_____}}{3 \text{ hr}}$ |
| 31. $\frac{35 \text{ mi}}{10 \text{ L}} = \frac{\text{_____}}{8 \text{ L}}$ | 32. $\frac{\text{_____}}{4 \text{ in}^3} = \frac{21 \text{ oz}}{6 \text{ in}^3}$ | 33. $\frac{27 \text{ min}}{24 \text{ ft}} = \frac{\text{_____}}{8 \text{ ft}}$ |

34. In 1909, French workmen removed a white stork's nest weighing 660 kilograms from the top of a cathedral. The nest also weighed 1452 pounds. Using these measurements, find the number of pounds in a kilogram.
- _____

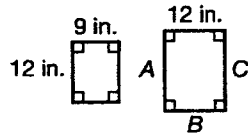
35. **History** The Northrop XB-35 aircraft used in World War II had a wingspan of 172 feet. Melba's model of this aircraft has a wingspan of $21\frac{1}{2}$ inches. How many feet does one inch of the model represent?
- _____

**Practice
10-7**

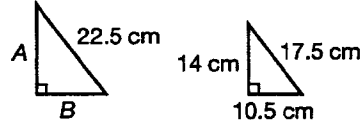
Similar Figures

Find the missing side lengths.

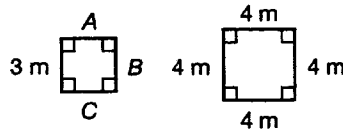
1. $A = \underline{\hspace{1cm}}$ $B = \underline{\hspace{1cm}}$ $C = \underline{\hspace{1cm}}$



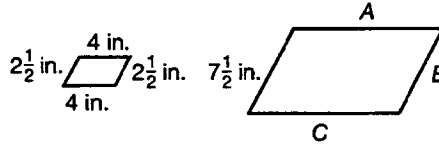
2. $A = \underline{\hspace{1cm}}$ $B = \underline{\hspace{1cm}}$



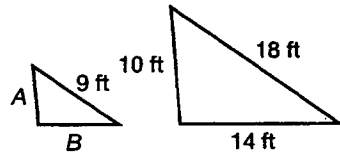
3. $A = \underline{\hspace{1cm}}$ $B = \underline{\hspace{1cm}}$ $C = \underline{\hspace{1cm}}$



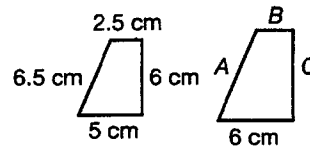
4. $A = \underline{\hspace{1cm}}$ $B = \underline{\hspace{1cm}}$ $C = \underline{\hspace{1cm}}$



5. $A = \underline{\hspace{1cm}}$ $B = \underline{\hspace{1cm}}$



6. $A = \underline{\hspace{1cm}}$ $B = \underline{\hspace{1cm}}$ $C = \underline{\hspace{1cm}}$



7. On the map, 1 inch equals 850 actual miles.

a. What are the actual distances between the cities?

New York to New Orleans

New Orleans to Miami

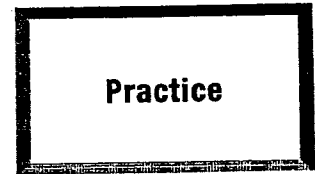
Miami to New York



b. Is the triangle shown on the map similar to the life-size triangle? Explain.

8. The lengths of the sides of a triangle are 45 cm, 55 cm, and 70 cm. The shortest side of a similar triangle has length 27 cm. What are the lengths of the other two sides of the similar triangle?

Name _____



Section 10B Review

Find the unit rate for each ratio.

1. $\frac{45 \text{ kg}}{15 \text{ m}}$ _____ 2. $\frac{48 \text{ lemons}}{\$8}$ _____ 3. $\frac{105 \text{ mi}}{3 \text{ hr}}$ _____
 4. $\frac{108 \text{ cows}}{6 \text{ acres}}$ _____ 5. $\frac{20 \text{ windows}}{4 \text{ doors}}$ _____ 6. $\frac{100 \text{ cars}}{25 \text{ min}}$ _____

Solve each proportion.

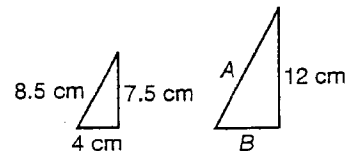
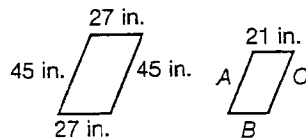
7. $\frac{15}{9} = \frac{3}{10}$ 8. $\frac{3}{18} = \frac{2}{\quad}$ 9. $\frac{\quad}{12} = \frac{21}{18}$
 10. $\frac{4 \text{ dogs}}{9 \text{ cats}} = \frac{\quad}{18 \text{ cats}}$ 11. $\frac{18 \text{ rings}}{\$20} = \frac{\quad}{\$30}$ 12. $\frac{25 \text{ gal}}{5 \text{ min}} = \frac{\quad}{4 \text{ min}}$

13. In 1996, a chocolate chip cookie with an area of 5240 square feet was made by Cookie Time of New Zealand. It contained about 5600 pounds of chocolate. This equals how many pounds of chocolate per square foot of cookie?

14. If Chester can type 75 words in 100 seconds, how many words could he type in 5 minutes?

In each pair of similar figures, find the missing side lengths.

15. $A =$ _____ $B =$ _____ $C =$ _____ 16. $A =$ _____ $B =$ _____



Name _____

**Practice
10-4**
What is a Proportion?

State whether or not each pair of ratios forms a proportion.

1. $\frac{6}{12} \pm \frac{12}{14}$ **No** 2. $\frac{3}{20} \pm \frac{2}{10}$ **No** 3. $\frac{20}{12} \pm \frac{25}{15}$ **Yes**
 4. $\frac{27}{6} \pm \frac{36}{8}$ **Yes** 5. $\frac{13}{11} \pm \frac{24}{20}$ **No** 6. $\frac{3}{4} \pm \frac{15}{20}$ **Yes**
 7. $\frac{10}{4} \pm \frac{45}{20}$ **No** 8. $\frac{15}{10} \pm \frac{3}{2}$ **Yes** 9. $\frac{12}{21} \pm \frac{16}{28}$ **Yes**
 10. $\frac{3}{24} \pm \frac{4}{32}$ **Yes** 11. $\frac{12}{20} \pm \frac{4}{7}$ **No** 12. $\frac{2}{9} \pm \frac{5}{22}$ **No**
 13. $\frac{6}{15} \pm \frac{4}{12}$ **No** 14. $\frac{15}{18} \pm \frac{20}{24}$ **Yes** 15. $\frac{17}{12} \pm \frac{10}{7}$ **No**
 16. $\frac{25}{35} \pm \frac{15}{21}$ **Yes** 17. $\frac{10}{9} \pm \frac{16}{14}$ **No** 18. $\frac{32}{36} \pm \frac{40}{45}$ **Yes**
 19. $\frac{2 \text{ tsp}}{7 \text{ gal}} \pm \frac{6 \text{ tsp}}{21 \text{ gal}}$ **Yes** 20. $\frac{12 \text{ cm}}{20 \text{ g}} \pm \frac{15 \text{ g}}{25 \text{ cm}}$ **No** 21. $\frac{\$14}{3 \text{ hr}} \pm \frac{\$84}{18 \text{ hr}}$ **Yes**
 22. $\frac{27 \text{ lb}}{\$21} \pm \frac{14 \text{ lb}}{\$18}$ **No** 23. $\frac{15 \text{ sec}}{21 \text{ sec}} \pm \frac{10 \text{ in.}}{15 \text{ in.}}$ **No** 24. $\frac{6 \text{ ft}}{13 \text{ gal}} \pm \frac{7 \text{ ft}}{14 \text{ gal}}$ **No**

For Exercises 25–30, choose the proportion that is written correctly.

25. a. $\frac{20 \text{ men}}{25 \text{ women}} = \frac{4 \text{ men}}{4 \text{ women}}$ b. $\frac{20 \text{ men}}{25 \text{ women}} = \frac{4 \text{ men}}{5 \text{ women}}$ c. $\frac{4 \text{ men}}{5 \text{ women}} = \frac{25 \text{ women}}{20 \text{ men}}$
 26. a. $\frac{27 \text{ acres}}{\$15} = \frac{\$25}{45 \text{ acres}}$ b. $\frac{\$27}{15 \text{ acres}} = \frac{\$25}{45 \text{ acres}}$ c. $\frac{45 \text{ acres}}{\$25} = \frac{27 \text{ acres}}{\$15}$
 27. a. $\frac{12 \text{ pies}}{4 \text{ cakes}} = \frac{6 \text{ cakes}}{18 \text{ pies}}$ b. $\frac{4 \text{ cakes}}{12 \text{ pies}} = \frac{6 \text{ cakes}}{18 \text{ pies}}$ c. $\frac{12 \text{ pies}}{4 \text{ cakes}} = \frac{6 \text{ pies}}{18 \text{ cakes}}$
 28. a. $\frac{6 \text{ gal}}{15 \text{ gal}} = \frac{2 \text{ min}}{5 \text{ min}}$ b. $\frac{5 \text{ min}}{15 \text{ gal}} = \frac{6 \text{ gal}}{2 \text{ min}}$ c. $\frac{6 \text{ gal}}{2 \text{ min}} = \frac{5 \text{ gal}}{15 \text{ min}}$
 29. a. $\frac{25 \text{ chairs}}{5 \text{ tables}} = \frac{10 \text{ tables}}{2 \text{ chairs}}$ b. $\frac{25 \text{ chairs}}{5 \text{ tables}} = \frac{2 \text{ tables}}{10 \text{ chairs}}$ c. $\frac{25 \text{ chairs}}{5 \text{ tables}} = \frac{10 \text{ chairs}}{2 \text{ tables}}$
 30. a. $\frac{36 \text{ lb}}{28 \text{ ft}} = \frac{18 \text{ lb}}{14 \text{ ft}}$ b. $\frac{18 \text{ lb}}{14 \text{ ft}} = \frac{28 \text{ lb}}{36 \text{ ft}}$ c. $\frac{36 \text{ ft}}{28 \text{ lb}} = \frac{18 \text{ lb}}{14 \text{ ft}}$
 31. During the butterfly stroke competitions at the 1972 Summer Olympic Games, Mayumi Aoki swam 100 meters in 64 seconds, and Karen Moe swam 200 meters in 136 seconds. Do these rates form a proportion? **No**
 32. At Deliah's Hardware, you can buy 5 feet of PVC pipe for \$1.10, or 8 feet for \$1.76. Are these prices proportional? **Yes**

Use with pages 530–533. 117

Name _____

**Practice
10-5**
**Solving Proportions
Using Cross Products**

Solve each proportion.

1. $\frac{12}{a} = \frac{16}{20}$ 2. $\frac{2}{8} = \frac{r}{20}$ 3. $\frac{30}{a} = \frac{20}{18}$ 4. $\frac{45}{x} = \frac{18}{8}$
 $a = 15$ $r = 5$ $a = 27$ $x = 20$
 5. $\frac{y}{5} = \frac{6}{3}$ 6. $\frac{15}{5} = \frac{6}{a}$ 7. $\frac{m}{8} = \frac{12}{16}$ 8. $\frac{40}{y} = \frac{16}{2}$
 $y = 10$ $a = 2$ $m = 6$ $y = 5$
 9. $\frac{16}{36} = \frac{g}{45}$ 10. $\frac{3}{28} = \frac{30}{21}$ 11. $\frac{4}{5} = \frac{8}{d}$ 12. $\frac{15}{5} = \frac{12}{c}$
 $g = 20$ $s = 40$ $d = 10$ $c = 4$
 13. $\frac{16}{28} = \frac{h}{7}$ 14. $\frac{2}{k} = \frac{3}{6}$ 15. $\frac{30}{3} = \frac{j}{2}$ 16. $\frac{3}{r} = \frac{8}{2}$
 $h = 4$ $k = 4$ $j = 20$ $r = 12$
 17. $\frac{20}{8} = \frac{f}{2}$ 18. $\frac{2}{20} = \frac{z}{10}$ 19. $\frac{20}{d} = \frac{4}{5}$ 20. $\frac{4}{q} = \frac{7}{2}$
 $f = 5$ $z = 1$ $d = 25$ $q = 14$
 21. $\frac{x}{15} = \frac{2}{6}$ 22. $\frac{2}{3} = \frac{b}{6}$ 23. $\frac{y}{2} = \frac{6}{4}$ 24. $\frac{2}{5} = \frac{n}{4}$
 $x = 5$ $b = 4$ $y = 3$ $n = 10$
 25. $\frac{10}{m} = \frac{8}{4}$ 26. $\frac{27}{6} = \frac{j}{8}$ 27. $\frac{g}{3.5} = \frac{1.6}{1.4}$ 28. $\frac{8}{36} = \frac{p}{9}$
 $m = 5$ $j = 36$ $g = 4$ $p = 2$
 29. $\frac{14}{16} = \frac{28}{p}$ 30. $\frac{t}{24} = \frac{10}{16}$ 31. $\frac{45}{3.5} = \frac{27}{u}$ 32. $\frac{10}{45} = \frac{2}{x}$
 $p = 32$ $t = 15$ $u = 20$ $x = 9$
 33. $\frac{25}{q} = \frac{15}{12}$ 34. $\frac{15}{20} = \frac{v}{4}$ 35. $\frac{p}{6} = \frac{3}{2}$ 36. $\frac{3}{7} = \frac{12}{a}$
 $q = 20$ $v = 3$ $p = 9$ $a = 28$
 37. **Measurement** If 5 pints of water weigh 80 oz, find the weight of 12 pints of water. **192 oz**
 38. In 1967, a minimum wage worker would receive \$84 for 60 hours of work. How much would the worker receive for 75 hours of work? **\$105**

118 Use with pages 534–537.

Name _____

**Practice
10-6**
**Solving Proportions
Using Unit Rates**

Find the unit rate for each.

1. $\frac{12 \text{ books}}{3 \text{ shelves}} = \frac{4 \text{ books}}{1 \text{ shelf}}$ 2. $\frac{14 \text{ tsp}}{7 \text{ gal}} = \frac{2 \text{ tsp}}{1 \text{ gal}}$ 3. $\frac{108 \text{ pages}}{9 \text{ hours}} = \frac{12 \text{ pages}}{1 \text{ hr}}$
 4. $\frac{6 \text{ gal}}{2 \text{ min}} = \frac{3 \text{ gal}}{1 \text{ min}}$ 5. $\frac{30.48 \text{ cm}}{12 \text{ in.}} = \frac{2.54 \text{ cm}}{1 \text{ in.}}$ 6. $\frac{40 \text{ mice}}{8 \text{ rats}} = \frac{5 \text{ mice}}{1 \text{ rat}}$
 7. $\frac{28 \text{ cats}}{4 \text{ dogs}} = \frac{7 \text{ cats}}{1 \text{ dog}}$ 8. $\frac{\$315}{35 \text{ hr}} = \frac{\$9}{1 \text{ hr}}$ 9. $\frac{10 \text{ CDs}}{5 \text{ tapes}} = \frac{2 \text{ CDs}}{1 \text{ tape}}$
 10. $\frac{90 \text{ cars}}{15 \text{ trucks}} = \frac{6 \text{ cars}}{1 \text{ truck}}$ 11. $\frac{14 \text{ cups}}{42 \text{ sec}} = \frac{1 \text{ cup}}{3 \text{ sec}}$ 12. $\frac{18 \text{ boys}}{18 \text{ girls}} = \frac{1 \text{ boy}}{1 \text{ girl}}$
 13. $\frac{576 \text{ pt}}{72 \text{ gal}} = \frac{8 \text{ pt}}{1 \text{ gal}}$ 14. $\frac{120 \text{ mi}}{3 \text{ hr}} = \frac{40 \text{ mi}}{1 \text{ hr}}$ 15. $\frac{35 \text{ carrots}}{10 \text{ potatoes}} = \frac{7 \text{ carrots}}{2 \text{ potatoes}}$
 16. $\frac{36 \text{ cups}}{18 \text{ bowls}} = \frac{2 \text{ cups}}{1 \text{ bowl}}$ 17. $\frac{68 \text{ men}}{17 \text{ women}} = \frac{4 \text{ men}}{1 \text{ woman}}$ 18. $\frac{375 \text{ ft}^2}{25 \text{ people}} = \frac{15 \text{ ft}^2}{1 \text{ person}}$

Solve each proportion using unit rates.

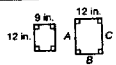
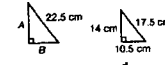
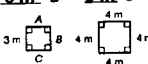
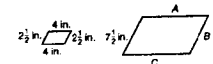
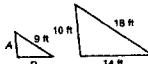
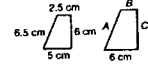
19. $\frac{28 \text{ cows}}{20 \text{ moose}} = \frac{14 \text{ cows}}{10 \text{ moose}}$ 20. $\frac{25 \text{ pt}}{10 \text{ ft}^2} = \frac{20 \text{ pt}}{8 \text{ ft}^2}$ 21. $\frac{7 \text{ hits}}{2 \text{ innings}} = \frac{21 \text{ hits}}{6 \text{ innings}}$
 22. $\frac{4 \text{ ft}}{12 \text{ sec}} = \frac{2 \text{ ft}}{6 \text{ sec}}$ 23. $\frac{\$15}{9 \text{ lb}} = \frac{\$5}{3 \text{ lb}}$ 24. $\frac{15 \text{ meals}}{3 \text{ days}} = \frac{25 \text{ meals}}{5 \text{ days}}$
 25. $\frac{5 \text{ drops}}{50 \text{ gal}} = \frac{3 \text{ drops}}{30 \text{ gal}}$ 26. $\frac{10^\circ}{2 \text{ hr}} = \frac{15^\circ}{3 \text{ hr}}$ 27. $\frac{32 \text{ gal}}{4 \text{ hr}} = \frac{16 \text{ gal}}{2 \text{ hr}}$
 28. $\frac{45 \text{ in.}}{5 \text{ lb}} = \frac{18 \text{ in.}}{2 \text{ lb}}$ 29. $\frac{12 \text{ lb}}{4 \text{ sec}} = \frac{3 \text{ lb}}{1 \text{ sec}}$ 30. $\frac{\$6}{2 \text{ hr}} = \frac{\$9}{3 \text{ hr}}$
 31. $\frac{35 \text{ mi}}{10 \text{ L}} = \frac{28 \text{ mi}}{8 \text{ L}}$ 32. $\frac{14 \text{ oz}}{4 \text{ in}^3} = \frac{21 \text{ oz}}{6 \text{ in}^3}$ 33. $\frac{27 \text{ min}}{24 \text{ ft}} = \frac{9 \text{ min}}{8 \text{ ft}}$
 34. In 1909, French workmen removed a white stork's nest weighing 680 kilograms from the top of a cathedral. The nest also weighed 1452 pounds. Using these measurements, find the number of pounds in a kilogram. **2.2 lb**
 35. **History** The Northrop XB-35 aircraft used in World War II had a wingspan of 172 feet. Melba's model of this aircraft has a wingspan of $21\frac{1}{2}$ inches. How many feet does one inch of the model represent? **8 ft**

Use with pages 538–542. 119

Name _____

**Practice
10-7**
Similar Figures

Find the missing side lengths.

1. $A = 16 \text{ in.}$, $B = 12 \text{ in.}$, $C = 16 \text{ in.}$ 2. $A = 18 \text{ cm}$, $B = 13.5 \text{ cm}$


 3. $A = 3 \text{ m}$, $B = 3 \text{ m}$, $C = 3 \text{ m}$ 4. $A = 12 \text{ in.}$, $B = 7\frac{1}{2} \text{ in.}$, $C = 12 \text{ in.}$


 5. $A = 5 \text{ ft}$, $B = 7 \text{ ft}$ 6. $A = 7.8 \text{ cm}$, $B = 3 \text{ cm}$, $C = 7.2 \text{ cm}$



7. On the map, 1 inch equals 850 actual miles.

a. What are the actual distances between the cities?

New York to New Orleans

≈ 1174 mi

New Orleans to Miami

≈ 670 mi

Miami to New York

≈ 1094 mi

b. Is the triangle shown on the map similar to the life-size triangle? Explain.

Possible answer: No; Earth's surface is curved.

8. The lengths of the sides of a triangle are 45 cm, 55 cm, and 70 cm. The shortest side of a similar triangle has length 27 cm. What are the lengths of the other two sides of the similar triangle?

33 cm; 42 cm

120 Use with pages 543–546.

Name _____

Practice

Section 10B Review

Find the unit rate for each ratio.

- $\frac{45 \text{ kg}}{15 \text{ m}} = \frac{3 \text{ kg}}{1 \text{ m}}$
- $\frac{48 \text{ lemons}}{\$8} = \frac{6 \text{ lemons}}{\$1}$
- $\frac{105 \text{ ml}}{3 \text{ hr}} = \frac{35 \text{ ml}}{1 \text{ hr}}$
- $\frac{108 \text{ cows}}{6 \text{ acres}} = \frac{18 \text{ cows}}{1 \text{ acre}}$
- $\frac{20 \text{ windows}}{4 \text{ doors}} = \frac{5 \text{ windows}}{1 \text{ door}}$
- $\frac{100 \text{ cars}}{25 \text{ min}} = \frac{4 \text{ cars}}{1 \text{ min}}$

Solve each proportion.

- $\frac{15}{50} = \frac{3}{10}$
- $\frac{3}{18} = \frac{2}{12}$
- $\frac{14}{12} = \frac{21}{18}$
- $\frac{4 \text{ dogs}}{9 \text{ cats}} = \frac{8 \text{ dogs}}{18 \text{ cats}}$
- $\frac{18 \text{ rings}}{\$20} = \frac{27 \text{ rings}}{\$30}$
- $\frac{25 \text{ gal}}{5 \text{ min}} = \frac{20 \text{ gal}}{4 \text{ min}}$

13. In 1996, a chocolate chip cookie with an area of 5240 square feet was made by Cookie Time of New Zealand. It contained about 5600 pounds of chocolate. This equals how many pounds of chocolate per square foot of cookie? About 1.07 lb/ft²

14. If Chester can type 75 words in 100 seconds, how many words could he type in 5 minutes? 225 words

In each pair of similar figures, find the missing side lengths.

15. A = 35 in. B = 21 in. C = 35 in. 16. A = 13.6 cm B = 6.4 cm

17. An instant pasta dinner package contains a packet of plain pasta plus a flavor packet weighing $\frac{1}{8}$ pound. If the entire package weighs $\frac{5}{16}$ pound, what is the weight of the plain pasta? [Lesson 6-3] $\frac{3}{16}$ lb

18. Mildred always has \$200 of her monthly salary transferred automatically to a savings account. The equation $y = x - 200$ gives the amount of her paycheck, where x is her after-tax income. Graph this equation. [Lesson 9-7]

Use with pages 548, 121

Name _____

Practice 10-8

What is a Percent?

Give the percent of each figure that is shaded.

- 40%
- 74%
- 50%
- 90%
- 0%
- 75%
- 37.5%
- 49%
- 65%

The circle graph shows the educational attainment of Americans over 25 years old in 1994. Use the graph for Exercises 10-12.

10. What percent of the population has completed less than 4 years of high school? 19%

4 years of high school or more? 81%

11. Which category includes the highest percent of Americans over 25? 4 yrs h.s. but < 4 yrs college

What is the percent? 59%

12. Which two categories combined amount for 41% of Americans over 25? < 4 yrs h.s., ≥ 4 yrs college

13. Geography 22% of the land in Vietnam is arable (suitable for farming). What percent is not arable? 78%

122 Use with pages 550-553.

Name _____

Practice 10-9

Estimating Percents

Estimate what percent of each figure is shaded.

- ≈ 60%
- ≈ 40%
- ≈ 60%
- ≈ 40%
- ≈ 40%
- ≈ 60%
- ≈ 50%
- ≈ 50%
- ≈ 80%

Estimate the percent.

- 13 out of 66 ≈ 20%
- 31 out of 118 ≈ 25%
- 18 out of 21 ≈ 90%
- 73 out of 80 ≈ 90%
- 47 out of 77 ≈ 60%
- 83 out of 190 ≈ 50%
- $\frac{312}{420} \approx 75\%$
- $\frac{59}{84} \approx 70\%$
- $\frac{25}{240} \approx 10\%$
- $\frac{45}{148} \approx 30\%$
- $\frac{59}{74} \approx 80\%$
- $\frac{88}{116} \approx 75\%$
- $\frac{41}{47} \approx 90\%$
- $\frac{51}{95} \approx 60\%$

24. In 1989, the EarthGrains Bakery in Fort Payne, Alabama, set a world record by baking a cake weighing 128,000 lb. The cake included 16,000 lb of icing. About what percent of the cake was icing? About 10%

25. Patents are issued to inventors to prevent others from stealing their ideas. In 1965, 37,000 out of 63,000 patents were issued to U.S. corporations. About what percent is this? About 60%

Use with pages 554-557, 123

Name _____

Practice 10-10

Converting Percents to Fractions and Decimals

Convert to a fraction in lowest terms.

- 80% $\frac{4}{5}$
- 25% $\frac{1}{4}$
- 78% $\frac{39}{50}$
- 98% $\frac{49}{50}$
- 32% $\frac{8}{25}$
- 30% $\frac{3}{10}$
- 45% $\frac{9}{20}$
- 118% $\frac{59}{50}$
- 65% $\frac{13}{20}$
- 185% $\frac{37}{20}$
- 63% $\frac{63}{100}$
- 28% $\frac{7}{25}$
- 275% $\frac{11}{4}$
- 84% $\frac{21}{25}$
- 104% $\frac{26}{25}$
- 18% $\frac{9}{50}$

Convert to a percent.

- $\frac{7}{10}$ 70%
- $\frac{37}{50}$ 74%
- $\frac{1}{2}$ 50%
- $\frac{18}{25}$ 72%
- 0.41 41%
- 0.03 3%
- 0.74 74%
- 0.92 92%
- $\frac{123}{300}$ 41%
- $\frac{15}{20}$ 75%
- $\frac{31}{20}$ 155%
- $\frac{1}{10}$ 10%
- 0.67 67%
- 4.10 410%
- 0.8 80%
- 0.137 13.7%

Give the shaded part of each figure as a percent, fraction, and decimal.

- percent: 40% fraction: $\frac{2}{5}$ decimal: 0.4
- percent: 55% fraction: $\frac{11}{20}$ decimal: 0.55
- percent: 60% fraction: $\frac{3}{5}$ decimal: 0.6
- percent: 30% fraction: $\frac{3}{10}$ decimal: 0.3

37. In 1993, about $\frac{1}{50}$ of American children lived with relatives other than their parents. Convert this value to a percent. 2%

38. In 1950, $\frac{2}{25}$ of the American population was at least 65 years old. What percent is this? 8%

124 Use with pages 558-562.