

**RATIOS,  
PROPORTIONS,  
&  
PERCENTS**

by

Jolene M. Morris  
*1454 W Settlers Wy #11*  
Murray, Utah 84123  
(801) 261-5622 VOICE  
(801) 261-5635 MODEM

## RATIOS, PROPORTIONS, & PERCENTS

### Starting Concepts' Input Numbers

- 230 CONCEPT: Definition of ratio
- 530 practice writing ratios from symbols
- 670 handout #2
- 740 practice writing ratios with tangrams
- 880 handout #3
- 950 CONCEPT: Denominate numbers
- 1020 practice writing denominate numbers
- 1190 handout #4
- 1260 CONCEPT: Ratios used to show rates
- 1330 practice using ratios to show rates
- 1490 handout #5
- 1560 CONCEPT: Ratios should be simplified
- 1610 practice simplifying ratios
- 1670 handout #6
- 1780 CONCEPT: Comparing ratios
- 1970 practice comparing ratios
- 2050 handout #7
- 2250 TEST: Test on ratios
- 2480 handout #8
- 2550 CONCEPT: Definition of a proportion
- 2580 practice recognizing proportions
- 2650 handout #9
- 2720 using tangrams to complete proportions
- 2820 handout #10
- 2890 CONCEPT: Solving proportions
- 3530 practice solving proportions
- 3600 handout #11
- 3700 CONCEPT: Converting measurements
- 3740 practice converting measurements
- 3800 handout #12
- 3900 CONCEPT: Solving story problems
- 3960 practice solving story problems
- 3975 handout #13
- 4010 CONCEPT: Definition of percents
- 4020 practice recognizing percents
- 4050 handout #14
- 4090 CONCEPT: Solving percent problems
- 5020 practice solving percent problems
- 5050 handout #15
- 6070 TEST: Final test (handout #16)

## HANDOUT #1

- Two numbers can be compared by using \_\_\_\_\_ or by using \_\_\_\_\_.
- Define ratio \_\_\_\_\_.
- Name the three ways ratios can be written:
  - \_\_\_\_\_
  - \_\_\_\_\_
  - \_\_\_\_\_
- Do you label ratios? \_\_\_\_\_
- Give an example of a denominate number, \_\_\_\_\_.
- Do you change denominate numbers to the same units before writing them as ratios? \_\_\_\_\_
- Do you change rates to the same units before writing them as ratios? \_\_\_\_\_
- Should you simplify ratios? \_\_\_\_\_
- Define proportions \_\_\_\_\_.
- How many ways are there to solve a proportion? \_\_\_\_\_
- Explain how to solve a proportion, \_\_\_\_\_.
- Complete:
  - \_\_\_\_\_ feet = 1 yard
  - \_\_\_\_\_ pints = 1 quart
  - \_\_\_\_\_ ounces = 1 pound
  - \_\_\_\_\_ inches = 1 foot
  - \_\_\_\_\_ quarts = 1 gallon
  - \_\_\_\_\_ hours = 1 day
  - \_\_\_\_\_ inches = 1 yard
  - \_\_\_\_\_ days = 1 week
  - \_\_\_\_\_ ounces = 1 pint
  - \_\_\_\_\_ minutes = 1 hour
  - \_\_\_\_\_ seconds = 1 minute
  - \_\_\_\_\_ weeks = 1 year
  - \_\_\_\_\_ pounds = 1 ton
  - \_\_\_\_\_ yards = 1 mile
  - \_\_\_\_\_ degrees = 1 circle
  - \_\_\_\_\_ feet = 1 mile
- Define percent \_\_\_\_\_.
- Write the "percent proportion" \_\_\_\_\_.



### HANDOUT #3

INSTRUCTIONS: Write these ratios all three ways. The small triangle is equal to one.

1. S-TRIANGLE                      PARALLELOGRAM
2. M-TRIANGLE                      L-TRIANGLE
3. SQUARE                              S-TRIANGLE
4. PARALLELOGRAM                      SQUARE
5. S-TRIANGLE                      M-TRIANGLE
6. PARALLELOGRAM                      M-TRIANGLE
7. S-TRIANGLE                      S-TRIANGLE
8. SQUARE                              L-TRIANGLE
9. M-TRIANGLE                      SQUARE
10. L-TRIANGLE                      L-TRIANGLE
11. PARALLELOGRAM                      S-TRIANGLE
12. SQUARE                              SQUARE
13. L-TRIANGLE                      M-TRIANGLE
14. S-TRIANGLE                      SQUARE
15. L-TRIANGLE                      S-TRIANGLE
16. M-TRIANGLE                      PARALLELOGRAM
17. L-TRIANGLE                      SQUARE
18. SQUARE                              PARALLELOGRAM
19. M-TRIANGLE                      S-TRIANGLE
20. SQUARE                              M-TRIANGLE
21. L-TRIANGLE                      PARALLELOGRAM
22. M-TRIANGLE                      M-TRIANGLE
23. PARALLELOGRAM                      PARALLELOGRAM
24. S-TRIANGLE                      L-TRIANGLE
25. PARALLELOGRAM                      L-TRIANGLE

## HANDOUT #4

INSTRUCTIONS: Write these ratios all three ways.

1. 48 hours ... 20 hours
2. 3 items ... 1 dozen
3. 4 inches ... 10 inches
4. 40 minutes ... 1 hour
5. 1 dollar ... 1 nickel
6. 18 items ... 3 dozen
7. 45 seconds ... 2 minutes
8. 1 dime ... 1 half dollar
9. 2 feet ... 5 yards
10. 3 quarters ... 4 nickels
11. 18 months ... 6 years
12. 20 inches ... 3 feet
13. 1 pint ... 6 ounces
14. 1 circle ... 25 degrees
15. 17 days ... 1 non-leap year
16. 4 days ... 2 weeks
17. 248 pounds ... 1 ton
18. 7 dimes ... 2 dollars
19. 37 weeks ... 2 years
20. 3 quarts ... 3 pints
21. 3 minutes ... 29 seconds
22. 987 feet ... 6 miles
23. 2 half dollars ... 7 nickels
24. 2 gallons ... 2 quarts
25. 3 hours ... 4 minutes
26. 2 yards ... 17 feet
27. 5 dozen ... 4 items
28. 2 tons ... 45 pounds
29. 1 leap year ... 22 days
30. 1 yard ... 17 inches

## HANDOUT #5

INSTRUCTIONS: Write these ratios all three ways.

1. 264 kilometers in 3 hours
2. 5 apples for 57 cents
3. \$25 for 2 shirts
4. 3600 liters in 20 minutes
5. 384 miles on 24 gallons
6. 400 meters in 50 seconds
7. 9000 revolutions in 5 minutes
8. 4 tablets for 99 cents
9. \$175 for 30 m of linoleum
10. 800 feet in 16 seconds
11. 6 miles in 20 minutes
12. 3 candy bars for \$1
13. \$20 for 1 pair of jeans
14. 3 quarts in 24 hours
15. 167 miles on 14 gallons
16. 394 meters in 1 second
17. 72 revolutions per minute
18. \$185 for 20 kg of dill
19. 7 classes per day
20. 9 ribbons in 4 years
21. 5 baskets in 7 attempts
22. 6 cans for 89 cents
23. \$385 for both chairs
24. 14 wins after 23 games
25. \$38 for 2 pair of ski goggles

## HANDOUT #6

INSTRUCTIONS: Simplify these ratios

1.  $\frac{8}{10}$

16.  $\frac{18}{24}$

2.  $\frac{2}{4}$

17.  $\frac{7}{21}$

3.  $\frac{4}{6}$

18.  $\frac{9}{12}$

4.  $\frac{8}{16}$

19.  $\frac{20}{36}$

5.  $\frac{18}{32}$

20.  $\frac{12}{16}$

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

21.  $\frac{6}{42}$

7.  $\frac{6}{20}$

22.  $\frac{21}{28}$

8.  $\frac{32}{48}$

23.  $\frac{50}{75}$

9.  $\frac{14}{18}$

24.  $\frac{42}{60}$

10.  $\frac{4}{40}$

25.  $\frac{10}{16}$

11.  $\frac{24}{32}$

26.  $\frac{56}{64}$

12.  $\frac{10}{25}$

27.  $\frac{8}{20}$

13.  $\frac{36}{60}$

28.  $\frac{9}{54}$

14.  $\frac{8}{48}$

29.  $\frac{14}{16}$

15.  $\frac{6}{15}$

30.  $\frac{20}{32}$

## HANDOUT #7

INSTRUCTIONS: Tell which ratio is larger.

1. 1:4 or 1 TO 3
2. 2:3 or 5 TO 8
3. 5:8 or 7 TO 12
4. 2:3 or 7 TO 12
5. 11:16 or 3 TO 4
6. 1:6 or 1 TO 10
7. 4:5 or 3 TO 4
8. 1:4 or 5 TO 16
9. 2:5 or 3 TO 8
10. 7:16 or 2 TO 5
11. 1:2 or 1 TO 16
12. 1:10 or 1 TO 8
13. 1:2 or 3 TO 5
14. 3:8 or 1 TO 4
15. 3:10 or 2 TO 7
16. 5:8 or 11 TO 16
17. 4:5 or 5 TO 6
18. 1:5 or 1 TO 8
19. 5:6 or 7 TO 8
20. 13:16 or 5 TO 8
21. 3:5 or 1 TO 2
22. 5:6 or 8 TO 9
23. 3:8 or 5 TO 12
24. 1:12 or 1 TO 10
25. 21:25 or 5 TO 6
26. 1:2 or 1 TO 6
27. 1:3 or 3 TO 8
28. 2:3 or 3 TO 4
29. 2:5 or 1 TO 2
30. 3:4 or 5 TO 6

## HANDOUT #8

### RATIOS TEST

1. Write 3 ways: %%% \*\*\*\*\*
2. Write 3 ways: 17 sec ... 2 min
3. Write 3 ways: 89c for 450 nails
4. Simplify: 8/12
5. Which is larger: 3 TO 8 or 1:4
6. Write 3 ways: &&&&& %%%%
7. Write 3 ways: 3 yd ... 7 ft
8. Write 3 ways: 16 mi in 3 min
9. Simplify: 6/24
10. Which is smaller: 2 TO 3 or 5:12
11. Write 3 ways: @@@@@ !!!!!!!
12. Write 3 ways: 9 da ... 4 wks
13. Write 3 ways: 19 attacks in 5 wks
14. Simplify: 10/20
15. Which is larger: 2:5 or 7:10
16. Write 3 ways: \$ [CCCCC]
17. Write 3 ways: 2 dozen ... 7 items
18. Write 3 ways: \$470 for a fridge
19. Simplify: 9/27
20. Which is larger: 1:3 or 3:5
21. Write 3 ways: >>>> ??????
22. Write 3 ways: 5 pts ... 6 qts
23. Write 3 ways: 72 mi per hr
24. Simplify: 12/16
25. Which is smaller: 3:4 or 5:6
26. Write 3 ways: ]]] =====
27. Write 3 ways: 9 dimes ... 7 nickels
28. Write 3 ways: 26 pts in 3 wks
29. Simplify: 4/32
30. Which is smaller: 3:5 or 2:3

## HANDOUT #9

INSTRUCTIONS: Are these proportions? (Answer "yes" or "no")

1. 4:16 and 6:24
2. 2:10 and 4:20
3. 2:6 and 6:9
4. 5:15 and 7:21
5. 1:3 and 6:9
6. 12:15 and 20:25
7. 2:16 and 4:32
8. 9:12 and 3:4
9. 7:21 and 8:12
10. 15:20 and 5:25
11. 8:32 and 6:24
12. 12:16 and 6:30
13. 8:20 and 7:42
14. 16:24 and 8:12
15. 2:16 and 6:48
16. 6:15 and 12:30
17. 16:20 and 32:40
18. 15:20 and 15:25
19. 6:15 and 20:24
20. 6:12 and 8:16
21. 9:45 and 21:28
22. 15:25 and 24:30
23. 30:34 and 40:48
24. 8:10 and 12:15
25. 3:24 and 2:16
26. 21:56 and 30:48
27. 4:32 and 5:40
28. 15:18 and 3:24
29. 20:32 and 25:40
30. 3:12 and 2:8

## HANDOUT #10

INSTRUCTIONS: Tell which tangram piece would complete the proportion.

1. ? TO PARALLELOGRAM and S-TRIANGLE TO M-TRIANGLE
2. PARALLELOGRAM:L-TRIANGLE and PARALLELOGRAM:?
3. S-TRIANGLE/? and SQUARE/PARALLELOGRAM
4. M-TRIANGLE TO S-TRIANGLE and SQUARE TO ?
5. M-TRIANGLE:PARALLELOGRAM and ?:L-TRIANGLE
6. S-TRIANGLE/PARALLELOGRAM and ?/SQUARE
7. M-TRIANGLE TO L-TRIANGLE and PARALLELOGRAM TO ?
8. ?:L-TRIANGLE and SQUARE:M-TRIANGLE
9. PARALLELOGRAM/? and SQUARE/L-TRIANGLE
10. M-TRIANGLE TO PARALLELOGRAM and S-TRIANGLE TO ?
11. L-TRIANGLE:SQUARE and ?:M-TRIANGLE
12. PARALLELOGRAM/S-TRIANGLE and SQUARE/?

## HANDOUT #11

INSTRUCTIONS: Solve these proportions

$$1. \frac{?}{9} = \frac{90}{10}$$

$$11. \frac{16}{?} = \frac{20}{30}$$

$$2. \frac{30}{20} = \frac{?}{32}$$

$$12. \frac{21}{27} = \frac{70}{?}$$

$$3. \frac{12}{?} = \frac{16}{36}$$

$$13. \frac{?}{108} = \frac{8}{36}$$

$$4. \frac{44}{99} = \frac{48}{?}$$

$$14. \frac{21}{56} = \frac{?}{65}$$

$$5. \frac{?}{20} = \frac{27}{30}$$

$$15. \frac{28}{?} = \frac{48}{72}$$

$$6. \frac{54}{45} = \frac{?}{50}$$

$$16. \frac{12}{21} = \frac{16}{?}$$

$$7. \frac{10}{?} = \frac{12}{42}$$

$$17. \frac{?}{54} = \frac{6}{12}$$

$$8. \frac{27}{9} = \frac{45}{?}$$

$$18. \frac{40}{5} = \frac{?}{8}$$

$$9. \frac{?}{27} = \frac{32}{36}$$

$$19. \frac{27}{?} = \frac{30}{60}$$

$$10. \frac{28}{63} = \frac{?}{72}$$

$$20. \frac{63}{28} = \frac{108}{?}$$

## HANDOUT #12

1. 8 feet = \_\_\_\_\_ inches
2. 6 yards = \_\_\_\_\_ feet
3. 6 pounds = \_\_\_\_\_ ounces
4. 24 inches = \_\_\_\_\_ feet
5. 3 gallons = \_\_\_\_\_ quarts
6. 7 miles = \_\_\_\_\_ yards
7. 9 pints = \_\_\_\_\_ ounces
8. 36 inches = \_\_\_\_\_ yards
9. 3 tons = \_\_\_\_\_ pounds
10. 420 seconds = \_\_\_\_\_ minutes
11. 36 feet = \_\_\_\_\_ yards
12. 9 hours = \_\_\_\_\_ minutes
13. 28 miles = \_\_\_\_\_ feet
14. 6000 pounds = \_\_\_\_\_ tons
15. 5 days = \_\_\_\_\_ hours
16. 208 weeks = \_\_\_\_\_ years
17. 2 miles = \_\_\_\_\_ yards
18. 4 years = \_\_\_\_\_ weeks
19. 5 minutes = \_\_\_\_\_ seconds
20. 3 circles = \_\_\_\_\_ degrees
21. 49 days = \_\_\_\_\_ weeks
22. 720 degrees = \_\_\_\_\_ circles
23. 16 quarts = \_\_\_\_\_ gallons
24. 48 hours = \_\_\_\_\_ days
25. 5280 feet = \_\_\_\_\_ miles
26. 64 ounces = \_\_\_\_\_ pounds
27. 14 yards = \_\_\_\_\_ inches
28. 22 weeks = \_\_\_\_\_ days
29. 48 ounces = \_\_\_\_\_ pints
30. 1500 minutes = \_\_\_\_\_ hours

## HANDOUT #13

INSTRUCTIONS: Solve these verbal problems

1. Mr. Daniels drove 336 miles in eight hours. If he maintained this same speed, how many miles can he drive in 14 hours?
2. An airplane travels 975 miles in three hours. At the same rate of speed, how many ~~miles~~<sup>hours</sup> will it take to go 1300 miles?
3. On their vacation last summer, the Andersons traveled 1050 miles and used 70 gallons of gasoline. How many miles a gallon did they get?
4. A truck driver made a trip of 440 miles in eight hours. What was the average distance traveled per hour?
5. If you use six gallons of gas driving steadily for 90 miles, how much gas would you need for a trip of 150 miles?
6. On a trip of 768 miles, Tonie used 48 gallons of gasoline. How many gallons would be needed to go 1168 miles?
7. If Nancy earned \$51 in three weeks, how many weeks will it take her to earn \$85?
8. If 2700 bricks are needed to build 300 square feet of wall, how many bricks will be needed to build 1800 square feet of wall?
9. If it takes ten people six hours to assemble 100 stereo sets; how long would it take them to assemble 500 stereo sets?
10. A recipe for punch takes four cups of sugar to make six gallons of punch. How much sugar is required for nine gallons of punch?
11. Two out of three doctors recommend Bufferin. If there are 180,000 doctors in the United States, how many of them recommend Bufferin?
12. Two out of five high school graduates attend college. Three hundred seventy-five students will graduate so how many will go to college?
13. The scale on a map reads: 1 inch = 25 miles. The distance between two cities is three inches. How many miles between these two cities?
14. The umpire recorded five hits for every twelve boys at bat. Out of 180 boys, how many hits were recorded?
15. Chauncy had a total score of 144 points for all the games he played. If he earned 18 points each game, how many games did he play?

## HANDOUT #14

INSTRUCTIONS: Solve these percent proportions

$$1. \frac{44}{55} = \frac{\quad}{100}$$

$$2. \frac{\quad}{4} = \frac{93}{100}$$

$$3. \frac{50}{50} = \frac{\quad}{100}$$

$$4. \frac{\quad}{24} = \frac{52}{100}$$

$$5. \frac{\quad}{9} = \frac{50}{100}$$

$$6. \frac{9}{\quad} = \frac{36}{100}$$

$$7. \frac{3}{\quad} = \frac{5}{100}$$

$$8. \frac{10}{2} = \frac{\quad}{100}$$

$$9. \frac{72}{160} = \frac{\quad}{100}$$

$$10. \frac{59}{100} = \frac{\quad}{100}$$

$$11. \frac{\quad}{92} = \frac{48}{100}$$

$$12. \frac{39}{\quad} = \frac{52}{100}$$

$$13. \frac{90}{45} = \frac{\quad}{100}$$

$$14. \frac{\quad}{5} = \frac{84}{100}$$

$$15. \frac{3}{20} = \frac{\quad}{100}$$

$$16. \frac{\quad}{2} = \frac{18}{100}$$

$$17. \frac{5}{\quad} = \frac{50}{100}$$

$$18. \frac{60}{\quad} = \frac{12}{100}$$

$$19. \frac{1}{\quad} = \frac{4}{100}$$

$$20. \frac{\quad}{63} = \frac{75}{100}$$

$$21. \frac{7}{\quad} = \frac{70}{100}$$

$$22. \frac{48}{40} = \frac{\quad}{100}$$

$$23. \frac{\quad}{1} = \frac{85}{100}$$

$$24. \frac{65}{\quad} = \frac{50}{100}$$

$$25. \frac{260}{65} = \frac{\quad}{100}$$

$$26. \frac{3}{\quad} = \frac{4}{100}$$

$$27. \frac{12}{24} = \frac{\quad}{100}$$

$$28. \frac{\quad}{14} = \frac{80}{100}$$

$$29. \frac{8}{\quad} = \frac{8}{100}$$

$$30. \frac{\quad}{87} = \frac{41}{100}$$

## HANDOUT #15

INSTRUCTIONS: Solve.

1. What is 24% of 52?
2. 3 is what percent of 5?
3. 45% of what number is 90?
4. What is 2% of 18?
5. What percent of 4 is 1?
6. 12 is 24% of 18?
7. What is 87% of 41?
8. What percent of 36 is 9?
9. 20% of what number is 3?
10. What is 4% of 93?
11. 5 is what percent of 50?
12. 2% of what number is 10?
13. What is 64% of 75?
14. 8 is what percent of 8?
15. 50 is 50% of what number?
16. What is 5% of 84?
17. 60 is what percent of 12?
18. 100% of what number is 59?
19. What is 14% of 80?
20. What percent of 50 is 65?
21. 160% of what number is 72?
22. What is 9% of 50?
23. 3 is what percent of 4?
24. 65% of what number is 260?
25. What is 92% of 48?
26. What percent of 70 is 7?
27. 44 is 55% of what number?
28. What is 1% of 85?
29. 39 is what percent of 52?
30. 40% of what number is 48?

**HANDOUT #16**  
**FINAL TEST**  
Ratios, Proportions, & Percents

1. Write this ratio three ways: ##### @@@@@@
2. Write this ratio three ways: 35 minutes ... 2 hours
3. Write this ratio three ways: 4 cans of corn for 95 cents
4. Simplify this ratio: 18 TO 21
5. Tell which ratio is larger: 4:5 or 7:9
6. Is this a proportion? 12:16 ... 8:10
7. Solve this proportion:  $?/6 = 10/15$
8. Six days = \_\_\_\_\_ hours
9. A tree casts a shadow of 15 feet while a 6-foot man casts a shadow of 2 feet.  
How tall is the tree?
10. What is 13% of 97?
11. Six is what percent of 10?
12. 20% of what number is 13?