

Accelerated Math Extra Practice (5.1-5.4)
 (Ratios, Rates, Unit Rates, Complex Fractions, Dimensional Analysis)

Name Key
 Block _____ Date _____

Directions: SHOW ALL STEPS as discussed in class. You may use a calculator on some problems.

1) Tara typed for 12 minutes and produced 456 words. Find the unit rate.

$$\frac{\text{words}}{\text{min}} \quad \frac{456}{12} = 38 \text{ words/min}$$

2) There are 180 students in the 7th grade at LMS. If there are 100 boys in the class, find the ratio of girls to boys.

$$\frac{\text{girls}}{\text{boys}} \quad \frac{180-100}{100} = \frac{80}{100} = \frac{4}{5}$$

3) Simplify. Do not convert to decimals. (No calculator)

$$\frac{2\frac{1}{4}}{36} = 2\frac{1}{4} \div 36 = \frac{9}{4} \div \frac{36}{1}$$

$$= \frac{9}{4} \cdot \frac{1}{36}$$

$$= \frac{1}{16}$$

4) A bag of 24 jolly ranchers cost \$2.89. Another bag costs \$4.59 and contains 50 jolly ranchers. Find the best buy based on unit price.

$$\frac{\text{cost}}{\text{j.r.}} \quad \frac{2.89}{24} = 0.1204 \rightarrow \$0.12/\text{j.r.}$$

$$\frac{\text{cost}}{\text{j.r.}} \quad \frac{4.59}{50} = 0.0918 \rightarrow \$0.09/\text{j.r.}$$

Best Buy

5) It takes Linda 20 minutes to read $8\frac{1}{3}$ pages of a book. What is her average reading rate in pages per minute? (No calculator)

$$\frac{\text{pages}}{\text{min}} \quad \frac{8\frac{1}{3}}{20} = 8\frac{1}{3} \div 20$$

$$= \frac{25}{3} \cdot \frac{1}{20}$$

$$= \frac{5}{12} \text{ pages/min}$$

6) Write $11\frac{1}{9}\%$ as a fraction in simplest form. (No calculator)

$$\begin{aligned}\frac{11\frac{1}{9}}{100} &= 11\frac{1}{9} \div 100 \\ &= \frac{100}{9} \cdot \frac{1}{100} \\ &= \left(\frac{1}{9}\right)\end{aligned}$$

8) A two pound bag of candy costs \$4.79. A twenty ounce bag costs \$2.75. Find the better buy based on unit price. (Remember 1 pound = 16 ounces)

$$\frac{\text{cost}}{\text{oz}} \quad \frac{4.79}{2(16)} = \frac{4.79}{32} = 0.1496 \rightarrow \$0.15/\text{oz}$$

$$\frac{\text{cost}}{\text{oz}} \quad \frac{2.75}{20} = 0.1375 \rightarrow \$0.14/\text{oz}$$

Best Buy

7) There are 48 jolly ranchers in a 20 ounce bag that costs \$3.89. Find the cost per jolly rancher.

$$\frac{\text{cost}}{\text{j.r.}} \quad \frac{3.89}{48} = 0.08104$$

$$\$0.08/\text{j.r.}$$

9) Two bottles of Spicy barbeque sauce, each bottle 24 ounces, cost \$4.89. Three bottles of Mild barbeque sauce, each bottle 18 ounces, cost \$6.29. Find the best buy based on unit price.

$$\text{Spicy} \quad \frac{\text{cost}}{\text{oz}} \quad \frac{4.89}{2(24)} = \frac{4.89}{48} = 0.1018$$

Best Buy
\$0.10/oz

$$\text{Mild.} \quad \frac{\text{cost}}{\text{oz}} \quad \frac{6.29}{3(18)} = \frac{6.29}{54} = 0.1164$$

\$0.12/oz

10) On his last math quiz, Mr. Macy answered $5\frac{2}{3}\%$ of the questions incorrectly. Write this percent as a fraction in simplest form. (No calculator)

$$5\frac{2}{3}\% = \frac{5\frac{2}{3}}{100} = \frac{5\frac{2}{3} \div 100}{100 \div 100} = \frac{17}{3} \cdot \frac{1}{100} = \frac{17}{300}$$

11) Mrs. Easton is making a curtain. She bought $2\frac{3}{4}$ yards of fabric. Her total cost was \$11. What was the cost per yard? (No calculator)

$$\frac{\text{cost}}{\text{yd}} = \frac{11}{2\frac{3}{4}} = 11 \div 2\frac{3}{4} = \frac{11}{1} \div \frac{11}{4} = \frac{11}{1} \cdot \frac{4}{11} = \$4/\text{yd}$$

12) A 36 oz bottle of Shelly's shampoo usually costs \$4.32. She buys it on sale for \$3.96. How much money does she save per ounce when she buys it on sale?

Reg $\frac{\text{cost}}{\text{oz}} = \frac{4.32}{36} = \$0.12/\text{oz}$

Sale $\frac{\text{cost}}{\text{oz}} = \frac{3.96}{36} = \$0.11/\text{oz}$

save $\$0.01/\text{oz}$

OR $\frac{4.32}{36} - \frac{3.96}{36} = \frac{.36}{36} = .01/\text{oz}$

13) Simplify (No calculator).

$$\frac{1}{\frac{10}{\frac{4}{5}}}$$

$$\frac{1}{10} \div \frac{4}{5} = \frac{1}{10} \cdot \frac{5}{4}$$

$$\frac{1}{8}$$

14) Use this data from a survey of 100 students to decide if the statement is true or false.
If false show why it is false.

One out of eight students eat a snack as soon as they get home from school.

What do you do first when you get home from school?

Activity	Number of students
Eat a snack	40
Do homework	10
Watch TV	20
Go to sports practice	30

Claim
 $\frac{\text{snack}}{\text{all}} = \frac{1}{8}$

$\frac{1}{8} \neq \frac{2}{5}$

Chart
 $\frac{\text{snack}}{\text{all}} = \frac{40}{100} = \frac{2}{5}$

False The data shows 2 out of 5 students ~~eat~~ snack not 1 out of 8

15) Which of these trail mix recipes is more "chocolaty" (more chocolate per total ounces)? Explain your reasoning.

Trail Mix A
 30 oz cheerios
 4 oz raisins
 10 oz M&M's

Trail Mix B
 40 oz cheerios
 2 oz raisins
 12 oz M&M's

$$\begin{array}{r} \text{choc oz} \\ \hline \text{total oz} \end{array} = \frac{10}{44}$$

0.2272

$$\frac{12}{54}$$

0.2222

Compare decimals

Trail Mix A more chocolaty

16) Matt runs at a speed of 720 feet per minute. How many feet per hour is this? Show steps using dimensional analysis.

$$\frac{720 \text{ ft}}{1 \text{ min}} \cdot \frac{60 \text{ min}}{1 \text{ hour}} = 720(60) = 43,200 \text{ ft/hour}$$

$$\left[\begin{array}{l} \text{Goal} \\ \frac{\text{ft}}{\text{hour}} \end{array} \right]$$

$$\boxed{60 \text{ min} = 1 \text{ hr}}$$

17) An elephant drinks about 225 liters per day. Use dimensional analysis to show how many milliliters per hour this is.

$$\frac{225 \text{ L}}{1 \text{ day}} \cdot \frac{1 \text{ day}}{24 \text{ hours}} \cdot \frac{1000 \text{ mL}}{1 \text{ L}}$$

$$\frac{225(1000)}{24} = \frac{225000}{24} = 9375 \text{ mL/hour}$$

$$\left[\begin{array}{l} \text{Goal} \\ \frac{\text{mL}}{\text{hour}} \end{array} \right]$$

$$\boxed{1 \text{ day} = 24 \text{ hours}}$$

$$\boxed{1 \text{ L} = 1000 \text{ mL}}$$

18) Convert 48.5 cm/sec to meters per minute using the process of dimensional analysis.

$$\frac{48.5 \text{ cm}}{1 \text{ sec}} \cdot \frac{1 \text{ m}}{100 \text{ cm}} \cdot \frac{60 \text{ sec}}{1 \text{ min}}$$

$$\frac{48.5(60)}{100} = \frac{2910}{100} = 29.1 \text{ m/sec}$$

$$\left[\begin{array}{l} \text{Goal} \\ \frac{\text{m}}{\text{min}} \end{array} \right]$$

$$\boxed{100 \text{ cm} = 1 \text{ m}}$$
$$\boxed{60 \text{ sec} = 1 \text{ min}}$$

← many ways to do this
 mL → ounces → cups → qts

19) Use the table on page 201 in your textbook and the process of dimensional analysis to convert 31 inches to centimeters. Round to the nearest hundredth. Goal cm

$$\frac{31 \cancel{\text{in}}}{1} \cdot \frac{2.540 \text{ cm}}{1 \cancel{\text{in}}} = (31)(2.54) =$$

78.74 cm

1 in = 2.540 cm

20) Use the table on page 201 in your textbook and the process of dimensional analysis to convert 245 milliliters to quarts. Round to the nearest hundredth. Goal qts

$$\frac{245 \cancel{\text{mL}}}{1} \cdot \frac{1 \cancel{\text{L}}}{1000 \cancel{\text{mL}}} \cdot \frac{1.057 \text{ qt}}{1 \cancel{\text{L}}} =$$

$$\frac{245(1.057)}{1000} = \frac{258.965}{1000}$$

0.2589

≈ 0.26 qts

mL → L → qt
 1000 mL = 1 L
 1 L = 1.057 qt

21) Use the table on page 201 in your textbook and the process of dimensional analysis to decide which is the fastest speed. 400 meters/hour OR 4 inches/second Goal m/hr

$$\frac{400 \cancel{\text{m}}}{1 \cancel{\text{hr}}} \cdot \frac{1 \cancel{\text{hr}}}{3600 \text{ sec}} \cdot \frac{1.094 \text{ yd}}{1 \cancel{\text{m}}} \cdot \frac{36 \text{ in}}{1 \cancel{\text{yd}}}$$

$$\frac{400(1.094)(36)}{3600} = \frac{15753.6}{3600} =$$

≈ 4.376 in/sec compared to 4 in/sec

m → yd → in
 1 m = 1.094 yd
 1 yd = 36 in

1 hr = 3600 sec

or

$$\frac{4 \cancel{\text{in}}}{1 \cancel{\text{sec}}} \cdot \frac{3600 \text{ sec}}{1 \text{ hr}} \cdot \frac{1 \cancel{\text{ft}}}{12 \cancel{\text{in}}} \cdot \frac{.305 \text{ m}}{1 \cancel{\text{ft}}}$$

$$\frac{4(3600)(.305)}{12} = \frac{4392}{12} =$$

366 m/hr compared to 400 m/hr *

in → ft → m
 12 in = 1 ft
 1 ft = .305 m

1 hr = 3600 sec

(many ways to do this one)