Accelerated Math 5.1–5.4

Ratios, Rates, Complex Fractions & Dimensional Analysis

Name Key

Block ____ Date ____

No Calculator for # 1-8. You may use a calculator for # 9-16.

1) Simplify

$$\frac{\frac{9}{10}}{\frac{15}{16}}$$

$\frac{9}{10} \div \frac{15}{16}$

$\frac{\cancel{9}^{3}}{\cancel{10}^{2}} \cdot \frac{\cancel{16}^{8}}{\cancel{15}_{5}^{3}}$

5

$\frac{24}{25}$

2) Simplify

$$\frac{3\frac{1}{2}}{14}$$

$3\frac{1}{2} \div 14$

$\frac{\cancel{7}^{1}}{2} \cdot \frac{1}{\cancel{14}_{2}}$

$\frac{1}{4}$

3) Write the word ratio and complex fraction that can be used to solve this problem. Then solve. In $3\frac{1}{4}$ hours, Sara runs 13 miles. Find her average rate of speed in miles per hour.

$\frac{\text{miles}}{\text{hour}}$ $\frac{13}{3\frac{1}{4}} = \frac{13}{1} \div 3\frac{1}{4}$

$= \frac{13}{1} \div \frac{13}{4}$

$= \frac{\cancel{13}}{1} \cdot \frac{4}{\cancel{13}} = 4$ mi/hr

4) Write $21\frac{2}{3}\%$ as a fraction in lowest terms.

$\frac{21\frac{2}{3}}{100} = 21\frac{2}{3} \div 100$

$= \frac{\cancel{65}^{13}}{3} \cdot \frac{1}{\cancel{100}_{20}}$

$= \frac{13}{60}$

5) Of the 24 students in math class, 15 are boys. What is the ratio of girls to boys? Give ratio in simplest form.

$\frac{\text{girls}}{\text{boys}}$ $\frac{24-15}{15} = \frac{9}{15} = \frac{3}{5}$

6) In $2\frac{1}{2}$ hours, Sara drove 170 miles. Find the unit rate in miles per hour.

$\frac{\text{mi}}{\text{hr}}$ $\frac{170}{2\frac{1}{2}} = 170 \div 2\frac{1}{2}$

$\frac{170}{1} \cdot \frac{1}{1} \cdot \frac{5}{2}$

$\frac{34}{\cancel{170}} \cdot \frac{2}{\cancel{5}}$

68 mi/hr

7) Write these ratios in simplest form:

A) 18 to 6 $\frac{18}{6} = \frac{3}{1}$

B) 12 to 20 $\frac{12}{20} = \frac{3}{5}$

C) $\frac{20 \text{ in}}{3 \text{ ft}}$ $\frac{20 \cancel{\text{in}}}{36 \cancel{\text{in}}} = \frac{5}{9}$

8) 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 five students go to sports practice 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	45
Do homework	10
Watch TV	20
Go to sports practice	25

Ratio of $\frac{\text{sports}}{\text{all}}$ is $\frac{25}{100} = \frac{1}{4}$

1 out of 4 students...

9) A 24 oz bottle of Shelly's shampoo usually costs $3.60. She buys it on sale for $3.12. How much money does she <u>save per ounce</u> when she buys it on sale?

cost per oz

Reg $3.60 \div 24 = \$.15/oz$

Sale $3.12 \div 24 = \$.13/oz$

$.15$
$-.13$
$\$.02/oz$

10) Jan drove 300 miles in 5 hours, Sue drove 180 miles in 4 hours, and Erika drove 480 miles in 8 hours. If they were all driving at constant speeds, which two girls were driving at the same rate? Explain (show) your reasoning using the concept of unit rate.

miles per hour

Jan $300 \div 5 = 60$ mi/hr

Sue $180 \div 4 = 45$ mi/hr.

Erika $480 \div 8 = 60$ mi/hr.

Jan + Erika

11) There are 36 jolly ranchers in a 24 ounce bag that costs $2.88. Find the cost per jolly rancher.

cost per j.r.

$2.88 \div 36$

$\$.08/j.r.$

12) A two pound bag of candy costs $4.39. An eighteen ounce bag costs $2.79. Find the <u>better buy based on unit price</u>.

2lb. = 32oz

cost per oz

$4.39 \div 32 = .1371$

$\$0.14/oz$

18oz

$2.79 \div 18 = .155$

$\$0.16/oz$

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

Trail Mix A	Trail Mix B
12 oz cheerios	~~26 oz cheerios~~
15 oz raisins	14 oz raisins
8 oz M&M's	12 oz M&M's

Choc M&Ms / Total: $\frac{8}{35}$ $\quad$ $\frac{12}{52}$

$.2285$ $\quad$ $.2307$

$.23 > .22$

14) Use the process of dimensional analysis to change 3080 feet/min to feet per hour. Goal: $\frac{ft}{hr}$

$$\frac{3080\ ft}{1\ min} \cdot \frac{60\ min}{1\ hr}$$

$3080(60)$

184,800 ft/hr

1 hr = 60 min

15) Use the process of dimensional analysis to convert 45 km/min to meters per second. Goal: $\frac{m}{sec}$

$$\frac{45\ km}{1\ min} \cdot \frac{1000\ m}{1\ km} \cdot \frac{1\ min}{60\ sec}$$

$$\frac{45(1000)}{60} = \frac{45000}{60}$$

= 750 m/sec

60 sec = 1 min

1000 m = 1 km

16) Use the process of dimensional analysis to convert 8 milliliters per minute to Liters per hour. Goal: $\frac{Liters}{hour}$

$$\frac{8\ mL}{1\ min} \cdot \frac{60\ min}{1\ hr} \cdot \frac{1\ L}{1000\ mL}$$

$$\frac{8(60)}{1000} = \frac{480}{1000}$$

.48 L/hr

1 L = 1000 mL

1 hr = 60 min