

\* Please note: There are many ways to solve the problems in this packet...

Comparing and Scaling Unit Review  
Math 6ES

the answer  
Key only  
Shows one  
strategy for each question!

Name Key  
Date \_\_\_\_\_

1.) There are 300 students in East Middle School. To plan transportation services for the new West Middle School, the school system surveyed East students. The survey asked whether students ride a bus to school or walk.

- In Mr. Archer's homeroom, 20 students ride the bus and 9 students walk.
- In Ms. Brown's homeroom, 14 students ride the bus and 9 students walk.
- In Mr. Chavez's homeroom, 20 students ride the bus and the ratio of bus riders to walkers is 5 to 3.

a.) Write a mathematical comparison statement using a ratio that compares the number of students in Mr. Archer's homeroom who are bus riders to the number who are walkers.

The ratio of bus riders to walkers in Mr. Archer's homeroom is 20 to 9.

b.) Write a mathematical comparison statement using a difference that compares the number of students in Ms. Brown's homeroom who are bus riders to the number who are walkers.

There are 5 more bus riders than walkers in Ms. Brown's homeroom.

c.) Write a mathematical comparison statement using a percent that compares the number of students who ride the bus from Ms. Brown's homeroom to the number of bus riders from Mr. Chavez's homeroom.

About 60% of students in Ms. Brown's homeroom ride the bus while 62.5% of students in Mr. Chavez's homeroom ride the bus.

d.) How many students in Mr. Chavez's homeroom walk to school?

$$\frac{5 \text{ (bus)}}{3 \text{ (walk)}} = \frac{20 \text{ (bus)}}{x}$$

$$20 \div 5 = 4$$

$$3 \times 4 = 12$$

12 walkers

e.) Use the information from these three homerooms. About how many East Middle School students would you expect to walk to school? How many would you expect to ride a bus?

Bus  $\rightarrow 20 + 14 + 20 = 54$

Walk  $\rightarrow 9 + 9 + 12 = 30$

Total  $\rightarrow 54 + 30 = 84$

Bus

 $\frac{54}{84} = \frac{x}{300}$   $x \approx 193$  students

Walk

 $\frac{30}{84} = \frac{x}{300}$   $x \approx 107$  students

f.) Suppose the new West Middle School will have 450 students and a ratio of bus riders to walkers that is about the same as that in East Middle School. About how many West Middle School students would you expect to walk to school? How many would you expect to ride the bus?

Bus

 $\frac{54}{84} = \frac{x}{450}$   
 $(450 \div 84) \times 54 \approx 289$

289 students

Walk

 $\frac{30}{84} = \frac{x}{450}$   
 $(450 \div 84) \times 30 \approx 161$   

161 students

2.) The organizers of an environmental conference order buttons for the participants. They pay \$18 for 12 dozen buttons. **Write and solve proportions** to answer each question. Assume the price is proportional to the size of the order.

a.) How much do 4 dozen buttons cost?

$$\frac{\$18}{12 \text{ doz}} = \frac{x}{4 \text{ doz}}$$

$\xrightarrow{\div 3}$        $\xrightarrow{\div 3}$   
 $\xrightarrow{\div 3}$

$$x = \$6$$

b.) How much do 50 dozen buttons cost?

$$\frac{\$18}{12 \text{ doz}} = \frac{x}{50 \text{ doz}}$$

$$50 \div 12 = 4.\overline{16}$$

$$18 \times 4.\overline{16} = 75$$

$$x = \$75$$

c.) How many dozens can the organizers buy for \$27?

$$\frac{\$18}{12 \text{ doz}} = \frac{\$27}{x}$$

$$27 \div 18 = 1.5$$

$$12 \times 1.5 = 18$$

$$18 \text{ dozen} = x$$

d.) How many dozens can the organizers buy for \$63?

$$\frac{\$18}{12 \text{ doz}} = \frac{\$63}{x}$$

$$63 \div 18 = 3.5$$

$$12 \times 3.5 = 42$$

$$x = 42 \text{ dozen}$$

3.) Which cereal is the best buy? Show all work!!

> A 14 ounce box for \$1.98  $14 \text{ oz} \div \$1.98 = 7.07 \text{ oz per } \$$

> A 36 ounce box for \$2.59  $36 \text{ oz} \div \$2.59 = 13.899 \text{ oz per } \$$

> A 1 ounce box for \$0.15  $1 \text{ oz} \div \$0.15 = 6.\overline{6} \text{ oz per } \$$

> A 72 ounce box for \$5.25  $72 \text{ oz} \div \$5.25 = 13.71 \text{ oz per } \$$

Best buy b/c you receive the most ounces per dollar.

4.) Sean has a paper route in his neighborhood. It takes him 50 minutes to deliver newspapers to the 40 customers on his route.

a.) How long will it take Sean to complete his route if he adds 20 more customers in his neighborhood? Show your work and/or explain your reasoning.

$$\frac{50 \text{ min}}{40 \text{ customers}} \div 2 = \frac{25 \text{ min}}{20 \text{ customers}} \times 3 = \frac{75 \text{ mins}}{60 \text{ customers}}$$

75 minutes

b.) Only 30 of Sean's 40 customers take the Sunday paper. About how long does it take Sean to deliver his papers on Sundays? Show your work and/or explain your reasoning.

$$\frac{50 \text{ min}}{40 \text{ cust.}} \div 4 = \frac{12.5 \text{ min}}{10 \text{ cust.}} \times 3 = \frac{37.5 \text{ min}}{30 \text{ cust}}$$

37.5 minutes

5.) Find **two** different unit rates for each situation. Make sure to label your answers with proper units.

a. You travel 250 miles in 5 hours.

$$\frac{250 \text{ mi}}{5 \text{ hrs}} \div 5 = \frac{50 \text{ mi}}{1 \text{ hr}} \quad \boxed{50 \text{ miles per hour}}$$

$$\frac{250 \text{ mi}}{5 \text{ hr}} \div 250 = \frac{1 \text{ mi}}{0.02 \text{ hr}} \quad \boxed{.02 \text{ hours per mile}}$$

b. A bookstore displays 50 copies of a book on 2 shelves.

$$\frac{50 \text{ books}}{2 \text{ shelves}} \div 2 = \frac{25 \text{ books}}{1 \text{ shelf}} = \boxed{25 \text{ books per shelf}}$$

$$\frac{50 \text{ books}}{2 \text{ shelves}} \div 50 = \frac{1 \text{ book}}{.04 \text{ shelf}} = \boxed{.04 \text{ shelves per book}}$$

c. You can read 80 pages in 2 hours

$$\frac{80 \text{ pages}}{2 \text{ hrs}} \div 80 = \frac{1 \text{ page}}{.025 \text{ hrs}} = \boxed{.025 \text{ hrs. per page}}$$

$$\frac{80 \text{ pages}}{2 \text{ hrs.}} \div 2 = \frac{40 \text{ pages}}{1 \text{ hr}} = \boxed{40 \text{ pages per hour}}$$

6.) How many pints are equivalent to 5 gallons?

1 gallon = 4 quarts  
1 quart = 2 pints

$$5 \times 1 \text{ gal} = 4 \text{ qts} \times 5$$

$$\hookrightarrow 5 \text{ gal} = 20 \text{ qts}$$

$$20 \times 1 \text{ qt} = 2 \text{ pints} \times 20$$

$$\hookrightarrow 20 \text{ qt} = 40 \text{ pints}$$

40 pints

7.) At Books Unlimited, 3 paperback books cost \$18. At Lots of Books, 8 paperback books cost \$40.

a.) Find **two different unit rates for each** of the book stores to express the relationship between number of books and price. Make sure to explain what each unit rate tells.

Books Unlimited

$$\frac{3 \text{ books}}{\$18} \div 3 = \frac{1 \text{ book}}{\$6}$$

\$6 per book

$$\frac{3 \text{ books}}{\$18} \div 18 = \frac{.1\bar{6} \text{ books}}{\$1}$$

.16 books per \$

Lots of Books

$$\frac{8 \text{ books}}{\$40} \div 8 = \frac{1 \text{ book}}{\$5}$$

\$5 per book

$$\frac{8 \text{ books}}{\$40} \div 40 = \frac{.2 \text{ book}}{\$1}$$

.2 books per \$

b.) Complete the rate table below.

| Number of Books | 1   | 2    | 3    | 4    | 5    | 6    | 7    | 8    | 10   | 15   | 20    |
|-----------------|-----|------|------|------|------|------|------|------|------|------|-------|
| Books Unlimited | \$6 | \$12 | \$18 | \$24 | \$30 | \$36 | \$42 | \$48 | \$60 | \$90 | \$120 |
| Lots of Books   | \$5 | \$10 | \$15 | \$20 | \$25 | \$30 | \$35 | \$40 | \$50 | \$75 | \$100 |

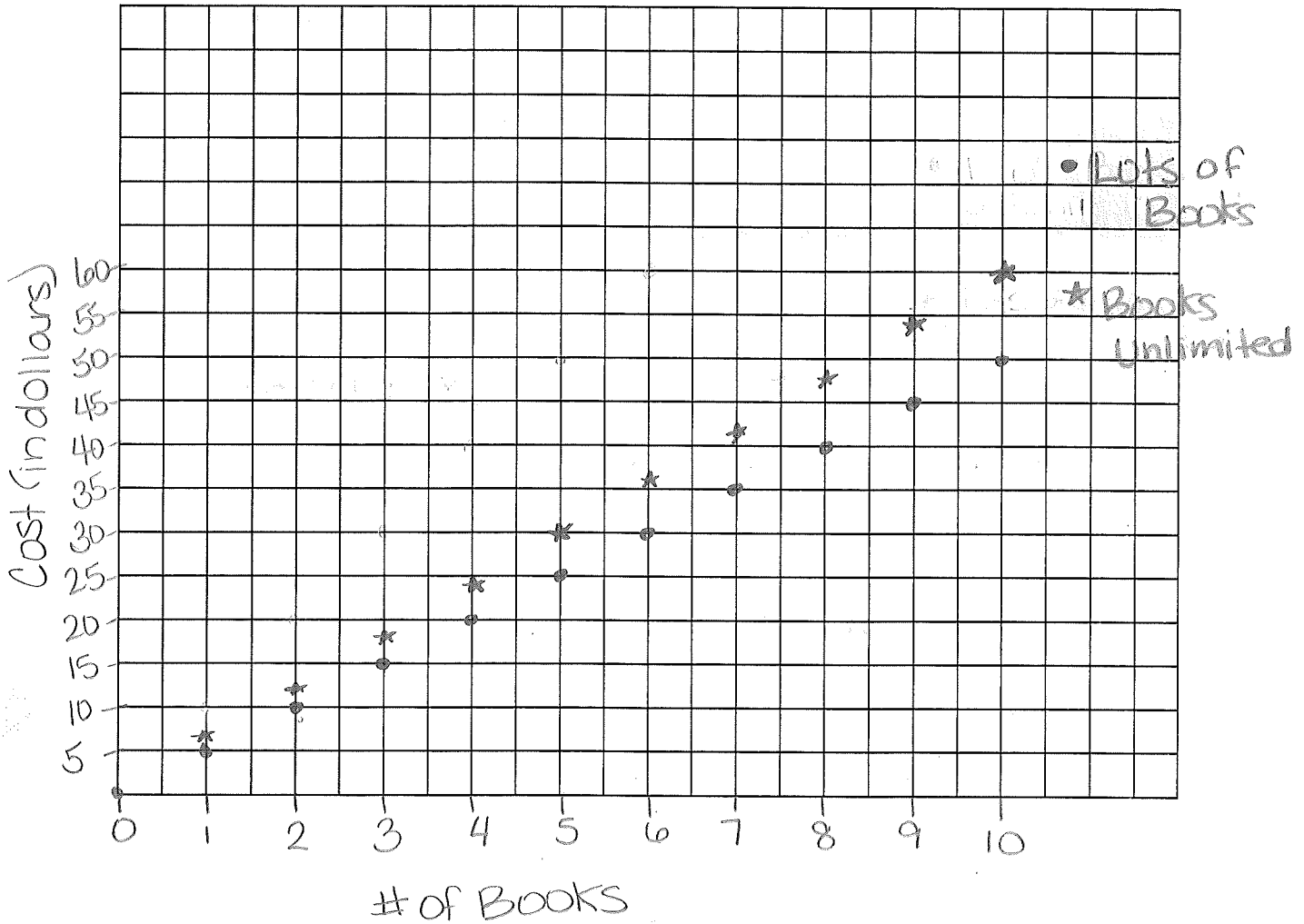
c.) Write an equation for each bookstore to show the cost, c, in dollars for any number of books, b.

Books Unlimited  $C = 6b$

Lots of Books  $C = 5b$

d.) Graph the relationships for both stores on the coordinate grid below.

### Books



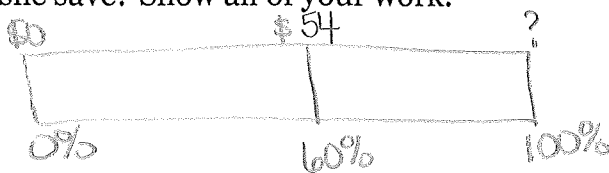
e.) What is the constant or proportionality for each of the relationships? Explain how you know.

Books Unlimited = 6

I know this because the constant of proportionality is equal to the unit rate.

Lots of Books = 5

8.) Karen bought her new I-pod at 40% off of the original price and paid \$54. How much money did she save? Show all of your work.



40% off = paid 60%

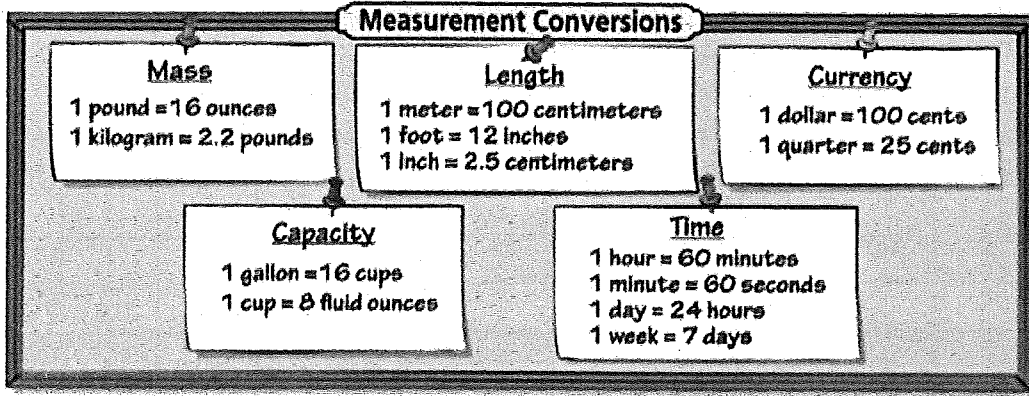
$$54 \div 60 = .9 \text{ (1\%)}$$

$$.9 \times 100 = 90$$

$$90 - 54 = 36$$

\$36

9.) Use the conversion chart below to answer the following questions. Show all work.



a.) How many ounces are in 7.5 pounds?

$$\begin{array}{r}
 1 \text{ pound} \xrightarrow{\times 7.5} 7.5 \text{ pounds} \\
 16 \text{ oz.} \quad \quad \quad \times 7.5 \rightarrow
 \end{array}$$

$x = 120 \text{ oz}$

b.) How many cups are in 35 gallons?

$$\begin{array}{l}
 35 \times 1 \text{ gallon} = 16 \text{ cups} \times 35 \\
 \hookrightarrow 35 \text{ gallons} = 560 \text{ cups}
 \end{array}$$

$560 \text{ cups}$

c.) About how many pounds are in 40 kilograms?

$$\begin{array}{l}
 \times 40 \hookrightarrow 1 \text{ Kg} = 2.2 \text{ pounds} \times 40 \\
 40 \text{ Kg} = ? \text{ pounds} \\
 \quad \quad \quad ? = 88
 \end{array}$$

$88 \text{ pounds}$

10.) Which of the tables below shows a proportional relationship? Explain how you know.

A.

|                 |   |   |    |    |    |    |    |
|-----------------|---|---|----|----|----|----|----|
| Number of Items | 0 | 1 | 2  | 3  | 4  | 5  | 6  |
| Cost            | 3 | 8 | 13 | 18 | 23 | 28 | 33 |

→ not proportional  
b/c it doesn't start at (0,0)

B.

|                 |   |   |   |   |    |    |    |
|-----------------|---|---|---|---|----|----|----|
| Number of Items | 0 | 1 | 2 | 3 | 4  | 5  | 6  |
| Cost            | 0 | 3 | 6 | 9 | 12 | 15 | 18 |

→ proportional b/c it starts at (0,0) and increases at a constant rate of \$3 per item.

C.

|                 |   |   |    |    |    |    |    |
|-----------------|---|---|----|----|----|----|----|
| Number of Items | 0 | 1 | 2  | 3  | 4  | 5  | 6  |
| Cost            | 0 | 5 | 15 | 30 | 65 | 80 | 85 |

→ not proportional  
b/c it does not change at a constant rate



11.) For a birthday party, Danielle's family takes her to a bowling alley that has a party room where her guests can have lunch. The cost is \$5.95 per guest for bowling and \$9.95 per guest for food and drinks.

a. If Danielle's party is for herself and 8 guests, what is the cost of bowling, food, and drinks?

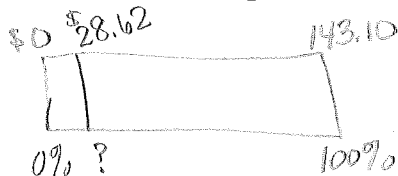
$$9 \times (5.95 + 9.95)$$

$$\boxed{\$143.10}$$

$$9 \times (15.90)$$

$$143.10$$

b. There is a gratuity for servers added to the bill. If that amount is \$28.62, what percent has been charged for the gratuity?



$$143.10 \div 28.62 = 5$$

$$100\% \div 5 = 20\%$$

$$\boxed{20\%}$$

c. Danielle's family has a discount coupon for 10% off the total price, including gratuity. What is the cost of the event after taking the discount?

$$143.10 + 28.62 = 171.72$$

$$\begin{array}{r} 171.72 \\ -17.17 \\ \hline \end{array}$$

$$\begin{array}{l} 171.72 \div 10 = 17.172 \approx 17.17 \\ (100\%) \qquad \qquad \qquad (10\%) \end{array}$$

$$154.55$$

$$\boxed{\$154.55}$$

d. In Danielle's state there is an 8% sales tax on the bowling, food, drinks, and gratuity for her party. The tax is calculated after the coupon is applied. What is the total cost of the event, including tax?

$$154.55 \div 100 = 1.5455 (1\%)$$

$$1.5455 \times 8 = 12.364 \approx 12.37 \text{ (tax)}$$

$$\boxed{\$166.92}$$

$$154.55 + 12.37 = 166.92$$

e. What is the actual total cost per guest, including Danielle?

$$166.92 \div 9 = 18.546$$

$$\boxed{\text{about } \$18.55 \text{ per person}}$$

