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*I can **use proportional reasoning** to solve problems.*

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**Using Proportional Reasoning**

1) Line up your proportional items as a table
2) Find the constant of proportionality (k)
3) Multiply or Divide by this constant.

**Example 1:**

Grandma's Recipe makes 24 cookies. Complete each recipe for the designated amounts of cookies.

| Grandma's Recipe for Sugar Cookies |
|---|
| 1 ½ cups butter |
| 2 cups sugar |
| 4 eggs |
| ¾ teaspoon baking powder |
| 1 ¼ cups flour |
| ¼ teaspoon salt |

24 cookies

| Grandma's Recipe for Sugar Cookies |
|---|
| 3 cups butter |
| 4 cups sugar |
| 8 eggs |
| 1.5 teaspoon baking powder |
| 2.5 cups flour |
| 0.5 teaspoon salt |

48 cookies

| Grandma's Recipe for Sugar Cookies |
|---|
| 2.25 cups butter |
| 3 cups sugar |
| 6 eggs |
| 1.125 teaspoon baking powder |
| 1.875 cups flour |
| 0.375 teaspoon salt |

36 cookies

| 24 | 48 | 36 |
|---|---|---|
| 1.5 | 3 | 2.25 |
| 2 | 4 | 3 |
| 4 | 8 | 6 |
| 0.75 | 1.5 | 1.125 |
| 1.25 | 2.5 | 1.875 |
| 0.25 | 0.5 | 0.375 |

**Example 2:**

A restaurant makes a special seasoning for all its grilled vegetables. Here are the ingredients mixed:

1/2 of the mixture is salt

1/4 of the mixture is pepper

1/8 of the mixture is garlic powder

1/8 of the mixture is onion powder

When the ingredients are mixed in the same ratio as shown above, every batch of seasoning tastes the same. Study the measurements for each batch in the table. Fill in the blanks so that every batch will taste the same.

| | Batch 1 | Batch 2 | Batch 3 | Part of Batch |
|---|---|---|---|---|
| Salt (cups) | 1 | 2 | 4 | 1/2 |
| Pepper (cups) | 1/2 | 1 | 2 | 1/4 |
| Garlic powder (cups) | $\frac{1}{4}$ | 1/2 | 1 | 1/8 |
| Onion powder (cups) | 1/4 | 1/2 | 1 | 1/8 |

The restaurant mixes a 12-cup batch of the mixture every week. How many cups of each ingredient do they use in the mixture each week?

6 cups salt 1/2 of 12

3 cups pepper 1/4 of 12

1.5 cups garlic powder 1/8 of 12

1.5 cups onion powder 1/8 of 12

**Example 3:**

Mary took 7 hours to read a biography that had 210 pages.

a. What was Mary's average reading rate, in pages per hour?

Show or explain how you got your answer.

$\frac{210 \text{ pgs}}{7 \text{ hr}} = 30 \text{ pgs/hr}$

b. Fill in the table below by using Mary's average reading rate from part (a).

**Mary's Reading Rate**

| Number of Hours ($x$) | Number of Pages ($y$) |
|---|---|
| 1 | 30 |
| 2 | 60 |
| 3 | 90 |
| 4 | 120 |

c. Write an equation that represents the relationship between x, the number of hours Mary read, and y, the number of pages she read.

$y = 30x$

d. How long will it take Mary to read 80 pages at the same average reading rate? Write your answer in terms of hours and minutes (for example, 4 hours 21 minutes instead of 4.35 hours). Show or explain how you got your answer.

$80 = 30x$

$x = 2\frac{2}{3}$ hrs so... 2 hrs 40 min

**Example 4:**

Line k has a proportional relationship between x and y. One point on this line is (2, 3). Find the missing coordinates shown.

1. ( 0 , 0 ) $\frac{3}{2} = \frac{0}{0}$
2. ( 3, 4.5 ) $\frac{x}{3} = \frac{3}{2}$
3. ( 8, 12 ) $\frac{x}{8} = \frac{3}{2}$
5. ( 4 , 6 ) $\frac{6}{x} = \frac{3}{2}$
5. ( 10 , 15 ) $\frac{15}{x} = \frac{3}{2}$

**Example 5:**

Hayden mixed 6 cups of blue paint with 8 cups of yellow paint to make green paint. Write an equation that shows the relationship between the number of cups of blue paint, *b*, and the number of cups of yellow paint, *y*, that are needed to create the same shade of green paint. The equation should be in the form $b = ky$.

$b = 0.75y$

How many cups of blue paint would she need to make same shade if she uses 20 cups of yellow paint?

$b = 0.75(20)$

$b = 15$ cups

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**EXIT:**