─── **Warm–Up** ───

Directions: Find the unit rate in each problem.

1. A six-pack of soda costs $3.36. How much does one soda cost?

2. A car travels 605 miles in 11 hours. What is the average number of miles traveled per hour?

3. What is the cost per pound? $\dfrac{\$5.48}{4 \text{ pounds of grapes}}$

4. Alex has a set of 9 music discs from the 1970's. There are 126 total songs on the discs. What is the average number of songs per disc?

5. What is the average miles per hour? $\dfrac{\frac{1}{4} \text{ of a mile}}{\frac{1}{6} \text{ of an hour}}$

LESSON 5: Proportional Relationships

Directions: Complete the following SOLVE problem with your teacher. You will only complete the S step.

A printing shop is making agendas for different middle schools in the area. Four of the middle schools are in the chart below. Listed below each school is the number of agendas and the price paid to the printing shop. Do the number of agendas and the cost form a proportional relationship?

Middle School	South Middle School	East Middle School	North Middle School	West Middle School
Number of Agendas	65	52	41	58
Cost	$585.00	$468.00	$369.00	$522.00

S Underline the question.
This problem is asking me to find _____
_____.

Directions: Complete this page with your teacher and partner.

1. Look at the models below. Write a fraction to represent each model.

2. Describe the relationship between the three fractions. Explain your thinking.	
3. Explain how to show that $\frac{3}{4}$ and $\frac{6}{8}$ are equivalent without a model.	
4. Explain how to show that $\frac{3}{4}$ and $\frac{9}{12}$ are equivalent without a model.	

LESSON 5: Proportional Relationships

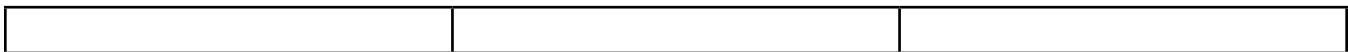**Directions:** Complete this page with your teacher and partner.

5. Color the models below to show the fractions listed underneath them.

$$\frac{8}{12}$$

$$\frac{4}{6}$$

$$\frac{2}{3}$$

6. Describe the relationship between the three fractions. Explain your thinking.	
7. Explain how to show that $\frac{8}{12}$ and $\frac{4}{6}$ are equivalent without a model.	
8. Explain how to show that $\frac{4}{6}$ and $\frac{2}{3}$ are equivalent without a model.	

9. You can find an equivalent fraction by _____ both the numerator and the denominator by the _____ number.

10. You can find an equivalent fraction by _____ both the numerator and the denominator by the _____ number.

Directions: Complete the following pairs of equivalent fractions by multiplying or dividing.

11. $\frac{2}{5} \bullet \frac{5}{5} =$ _____

12. $\frac{21}{49} \div \frac{7}{7} =$ _____

13. $\frac{4}{11} \bullet \frac{11}{11} =$ _____

14. $\frac{3}{5} \bullet \frac{3}{3} =$ _____

15. $\frac{9}{10} \bullet \frac{5}{5} =$ _____

16. $\frac{24}{36} \div \frac{12}{12} =$ _____

Directions: Complete this page with your teacher and partner.

1. What are the three ways that we can write ratios?

2. When two ratios are equivalent they form _____.
Let's look at the proportion $\frac{3}{4} = \frac{6}{8}$. We can make equivalent fractions. $\frac{3}{4} \cdot \frac{2}{2} = \frac{6}{8}$

3. This means that we can rewrite our proportion as _____ as _____. When we read
that proportion we would say, ___ is to ___ as ___ is to ___.

4. When we write the two ratios 3:4 as 6:8, which two numbers are in the middle?
_____ The two values in the middle are called the _____.

5. When we write the two ratios 3:4 as 6:8, which two numbers are on the
outside? _____ The two values on the outside are called the _____.

Look at the example in the graphic organizer below. The proportion has been
rewritten with colons to make it easier to identify the _____ and _____.

Problem Number	Fractions	Means	Product of the Means	Extremes	Product of the Extremes	Are the Products equal?
Example	$\frac{3}{4} = \frac{6}{8}$ 3:4 as 6:8					

6. What is the product when we multiply the means? (4 • 6)

What is the product when we multiply the extremes? (3 • 8)

7. Are the products equal? _____. If the products are equal; then the two fractions
form a _____.

LESSON 5: Proportional Relationships

Directions: Complete this page with your teacher and partner.

Complete the following table with your partner for Problems 1 - 4.

Problem Number	Fractions	Means	Product of the Means	Extremes	Product of the Extremes	Are the Products equal?
1	$\frac{2}{5} = \frac{10}{25}$					
2	$\frac{21}{49} = \frac{3}{7}$					
3	$\frac{4}{11} = \frac{44}{121}$					
4	$\frac{3}{5} = \frac{9}{15}$					

What do you notice about each set of the products of the means and the extremes for each fraction pair?

Below is Problem 1 from the graphic organizer

$$\frac{2}{5} = \frac{10}{25}$$

Sometimes the product of the means and the product of the extremes are called _____ of the proportion.

Two fractions have a proportional relationship if the _____ are equal.

Directions: Multiply the cross products to determine if the following fractions have a proportional relationship.

5. $\frac{5}{7}$ and $\frac{10}{14}$ **6.** $\frac{2}{3}$ and $\frac{15}{20}$ **7.** $\frac{3}{4}$ and $\frac{9}{12}$ **8.** $\frac{3}{4}$ and $\frac{7}{8}$

Directions: Complete this page with your teacher and partner.

You can also use tables to determine and display proportional relationships.

1. The table shows the number of roses it takes to make a certain number of floral arrangements.

Roses	6	12	18	24
Floral Arrangements	1	2	3	4

2. We can write four different ratios comparing the number of roses to the number of floral arrangements.

3. How can you tell if the relationship between roses and floral arrangements is a proportional relationship?

4. How did we tell if two ratios were in a proportional relationship?

5. Since we have four ratios, we would have to compare each ratio to every other ratio in order to use cross products. That might take some time. What do you notice about the first ratio we wrote?

6. We could simplify each ratio to a unit rate to see if they are all the same. Are they all the same?

7. When ratios simplify to the same unit rate, the quantities in those ratios form a _____.

Directions: Complete this page with your teacher and partner.

8. Let's look at another relationship to see if we can use unit rates to determine proportional relationships.
The table shows the number of miles a boat has traveled in a certain number of hours.

Hours	1	2	4	7
Miles	45	90	180	315

9. Write the ratios in miles per hour and find all the unit rates.

10. Can all the ratios be simplified to the same unit rate?

11. What is the unit rate?

12. How do you know when two quantities in a table form a proportional relationship?

Directions: Complete this section with your partner.
Do the following tables represent proportional relationships? How do you know?

1. The chart shows how much customers paid for cherries at the grocery store.

Pounds	1	2	5	6
Cost	$2.50	$5.00	$12.50	$15.00

2. The chart shows the number of miles Mike traveled for the total number of hours in a bike race.

Hours	1	2	3	4
Miles	10	18	27	32

Directions: Complete the following SOLVE problem with your teacher.

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S Underline the question.
This problem is asking me to find _____
_____.

O Identify the facts.
Eliminate the unnecessary facts.
List the necessary facts.

L Write in words what your plan of action will be.

Choose an operation or operations.

V Estimate your answer.

Carry out your plan.

E Does your answer make sense? (Compare your answer to the question.)

Is your answer reasonable? (Compare your answer to the estimate.)

Is your answer accurate? (Check your work.)
Write your answer in a complete sentence.

Directions: Solve the following problems using what you have learned about proportions.

1. $\frac{3}{n} = \frac{21}{35}$

2. $\frac{20}{8} = \frac{5}{n}$

3. $\frac{n}{4} = \frac{18}{6}$

Directions: Tell whether the quantities in the following ratios and tables form proportional relationships.

4. $\frac{4}{9}, \frac{12}{36}$

5. $\frac{8}{13}, \frac{64}{104}$

6. $\frac{5}{11}, \frac{55}{111}$

7.

x	1	2	3	4
y	4	8	12	16

8.

Gym Membership per month	1	2	3	4
Cost	$50	$75	$100	$125

9.

Babysitting hours	1	4	6	10
$ Earned	$12	$48	$72	$120

10.

Number of Books Purchased	1	2	3	4
Cost	$20	$30	$40	$50

Homework
. . . .

Name _____   **Date** _____

Directions: Write an equivalent fraction for each fraction below.

1. $\frac{5}{8} =$ **2.** $\frac{6}{7} =$ **3.** $\frac{2}{7} =$

Directions: Solve each proportion.

4. $\frac{3}{2} = \frac{24}{x}$ **5.** $\frac{x}{40} = \frac{9}{10}$ **6.** $\frac{3}{6} = \frac{4}{x}$

Directions: Tell whether the quantities in the following ratios and tables form proportional relationships.

7.

x	2	3	5	8
y	8	9	20	28

8.

x	1	3	5	9
y	$2.30	$6.90	$11.50	$20.70

9. Lunch Cost

Number of lunches	1	2	3	4
Lunch Cost	$8	$16	$24	$32

10. Jack's Car

Number of miles driven	100	150	200	250
Gas used in gallons	3	5.5	9	11.8