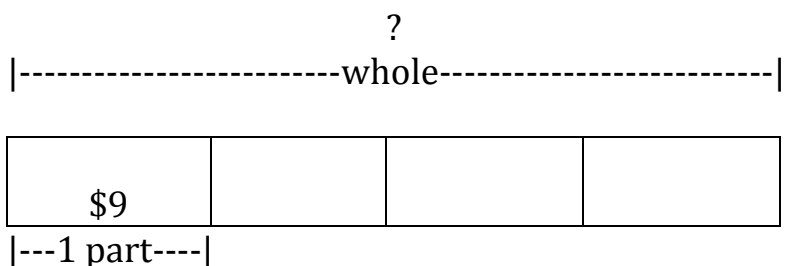# Algebra Concepts – Unit 2, Lesson 2

Part-Whole Model Involving Multiplication and Division

In our last lesson, we used the part-whole model for addition and subtraction. We will now use the part-whole models to solve problems involving multiplication and division.
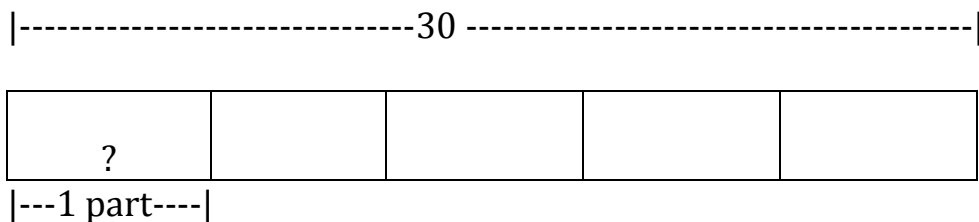
Here is what the part-whole model looks like for a multiplication or division problem.

Case 1 – We know the number of parts and the size of each part and we want to find the whole.

Karissa earns $9 per hour at a local retail outlet. How much does Karissa earn in 4 hours? Write the answer in a complete sentence.

```
                          ?
|-------------------------whole-------------------------|

 _____
|           |           |           |           |
|           |           |           |           |
|   $9      |           |           |           |
|_____|_____|_____|_____|
|---1 part----|
```

Case 2 – We know the number of parts and the total (or whole). We want to find the size of each part.

```
|------------------------------30 --------------------------------------|

 _____
|         |         |         |         |         |
|         |         |         |         |         |
|   ?     |         |         |         |         |
|_____|_____|_____|_____|_____|
|---1 part----|
```

Paige and four friends went to Flatbreads for pizza. The cost of their dinner was $30. How much should each person pay if they agree to split the cost evenly? Write the answer in a complete sentence.

Case 3 – We know the size of each part and the total (or whole). We want to find out how many parts there are. We use a torn page for this.

|----------------------------48--|

| 4 |

|---1 part----|-----How many more boxes of 4?----------------|

There are 48 people waiting for a chair lift. The chair lift can hold 4 people at a time. How many chairs are needed to transport the 48 people to the top of the mountain? Write the answer in a complete sentence.

Guided Practice

1. Tyler wants to buy a new i-pod for $180. He plans to save $20 per week. How long will it take Tyler to save $180? Write the answer in a complete sentence.

|----------------------------$180-----------------------------------|

| 20 |

|---1 part----|------→   -------|

2. Naomi hiked 6 miles in 4 hours. How many miles did Naomi hike per hour?   Write the answer in a complete sentence.

|----------------------------------6----------------------------------|
| ? | | | |

|----1 hour----|

3. Draw your own model and solve the problem.

   Dallas earns $9 per hour at a local retail store. How much will
   Dallas earn in 5 hours? Draw a model and answer the question in
   a complete sentence.

4. Autumn wanted 42 cookies for a party. There are 6 cookies in
   each package. How many packages does Autumn need? Draw a
   model and answer the question in a complete sentence.

5.   Solve the following equations visually.

a.
|----------------------------------60----------------------------------|

x				

   5x = 60   What is the value of x?

b.

|-------------------------10-------------------------------|

x			

4x = 10   What is the value of x?

Extension

1. Complete the pattern in the table.

Time (t)	0	1	2	3	4	5	6	7	8
Distance (d)	0	10	20	30					

Write a rule that would calculate the distance at any time.

2. Solve the following equations without a model

4x = 12   9n = 81 $\frac{12}{c} = 3$