**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----|

1. 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.

1. 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.
2. 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 $\frac{1}{None}c=3$