Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**

Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

UNIT 2 LESSON 5

**AIM**: SWBAT model and explain how to divide integers (p/q) when p<0 or p>0 and q>0 a using a number line

**THINK ABOUT IT!**

Marcus has $10 that he splits between his two friends. Represent this on a number line and indicate how much each friend gets.



Marcus is in debt $10 the next week. His same two friends help him out and split his debt between them. Represent this on a number line and indicate the debt each friend takes on.



**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**

Test the Conjecture #1) Evaluate the expression

Test the Conjecture #2) A diver descended to a depth of 128 feet below the surface. She stopped hallway down to take a break. What was the change in her depth before and after the break?

**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**



Conjecture

|  |
| --- |
| The quotient of a negative number divided by a positive number is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |

**PARTNER PRACTICE**

**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**

|  |
| --- |
| *Bachelor Level* |

1. Model the following expression on the number lines provided:
   1. -12 ÷ 3



* 1. 8 ÷ 4



* 1. -10 ÷ 5



* 1. 14 ÷ 2



|  |
| --- |
| *Master Level* |

1. A submarine starts at the surface and then descends to a depth of 250 feet below sea level. It took the submarine 5 minutes to complete this dive. How many feet can the submarine dive in 1 minute? Draw a model and write an expression to solve.
2. A person jumps off a diving board a falls 36 feet in three seconds. What integer represents the change in altitude in 1 second?

Step A: Describe why this is a division problem

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Step B: Draw a model and write an expression to solve

**INDEPENDENT PRACTICE**

**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**

|  |
| --- |
| *Bachelor Level* |

1. Model the following expressions on the number lines provided
   1. -15 ÷ 3





* 1. 9 ÷ 3



1. Explain why a negative number divided by a positive number has a negative quotient.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |
| --- |
| *Master Level* |

1. In the expression if p is a negative number and q is a positive number, what must be true about the quotient?
   1. It must be a positive number
   2. It must be a negative number
   3. There is no way to tell – need more info
   4. It will be positive or negative, depending on whether p or q has the larger absolute value
2. Explain your answer choice for question 4.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Model the following expressions by drawing an open number line:
   1. -140 ÷ 2
   2. -100 ÷ 4
   3. 90 ÷ 6
2. Joseph and his three friends decide to split the cost of a new gaming system that costs 360 dollars. Write an integer that describes the change to each person’s bank account. Draw a model and write an expression to solve.

|  |
| --- |
| *PhD Level* |

1. How is it possible that one model can represent more than 1 expression? Explain and provide an example.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Model the expression - using a method of your choice.

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**

**Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**EXIT TICKET**

|  |  |  |  |
| --- | --- | --- | --- |
| Self-assessment | I mastered the learning objective today. | I am almost there. | Need more practice and feedback. |
| Teacher feedback | You mastered the learning objective today. | You are almost there. | You need more practice and feedback. |

1. Model the quotient of - using a number line. Explain the process you used for creating your model. Be sure to identify the p and q values in your answer, and what they represent.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Jonathan started in debt $21 but his three friends decided to split the debt between them to help him out. What will be the change to each friend’s bank account? Write an expression and draw a number line modeling this situation and represent your answer as an integer.

**CFS for top quality work**

* + Problem is annotated
  + **P and q values** are labeled
  + Number line is drawn and labeled
  + Number line has **equal group sizes**