Lesson 12: Division of Integers

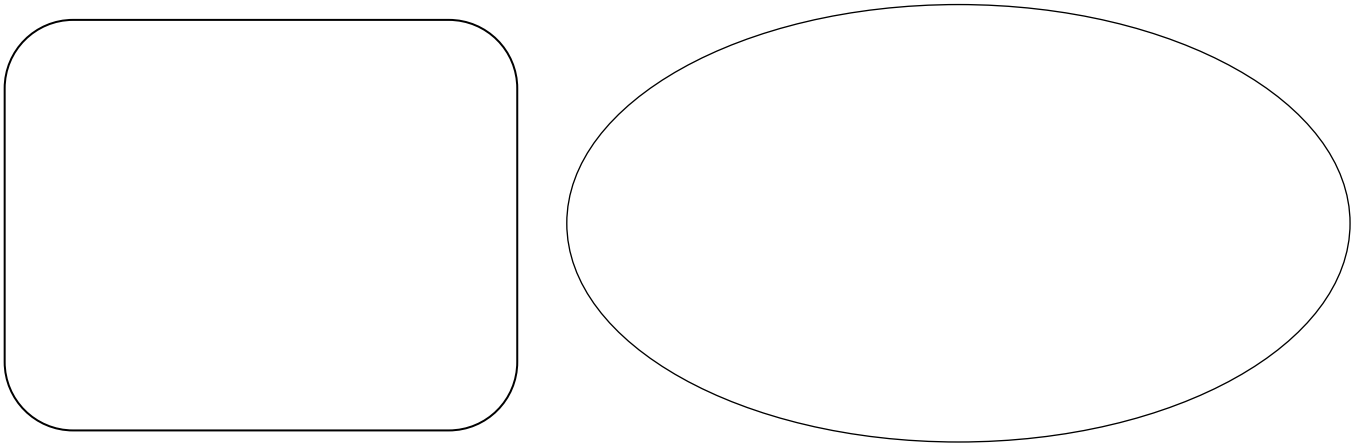
Classwork

Exercise 1: Recalling the Relationship Between Multiplication and Division

Record equations from Exercise 1 on the left.

Equations

Integers

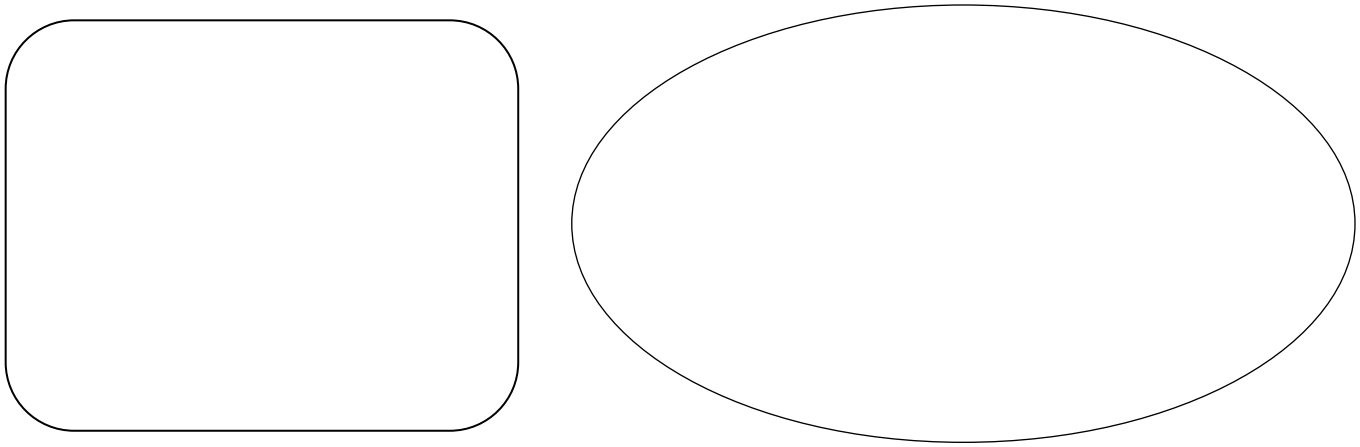


Example 1: Transitioning from Integer Multiplication Rules to Integer Division Rules

Record your group's number sentences in the space on the left below.

Equations

Integers



a. List examples of division problems that produced a quotient that is a negative number.

b. If the quotient is a negative number, what must be true about the signs of the dividend and divisor?

c. List your examples of division problems that produced a quotient that is a positive number.

d. If the quotient is a positive number, what must be true about the signs of the dividend and divisor?

Rules for Dividing Two Integers:

- A quotient is negative if the divisor and the dividend have _____ signs.
- A quotient is positive if the divisor and the dividend have _____ signs.

Exercise 2: Is the Quotient of Two Integers Always an Integer?

Is the quotient of two integers always an integer? Use the work space below to create quotients of integers. Answer the question and use examples or a counterexample to support your claim.

Work Space:

Answer:

Exercise 3: Different Representation of the Same Quotient

Are the answers to the three quotients below the same or different? Why or why not?

a. $-14 \div 7$

b. $14 \div (-7)$

c. $-(14 \div 7)$

Lesson Summary

The rules for dividing integers are similar to the rules for multiplying integers (when the divisor is not zero). The quotient is positive if the divisor and dividend have the same signs and negative if they have opposite signs.

The quotient of any two integers (with a non-zero divisor) will be a rational number. If p and q are integers, then.

$-\left(\frac{p}{q}\right) = \frac{-p}{q} = \frac{p}{-q}$.

Problem Set

1. Find the missing values in each column.

Column A	Column B	Column C	Column D
$48 \div 4 =$	$24 \div 4 =$	$63 \div 7 =$	$21 \div 7 =$
$-48 \div (-4) =$	$-24 \div (-4) =$	$-63 \div (-7) =$	$-21 \div (-7) =$
$-48 \div 4 =$	$-24 \div 4 =$	$-63 \div 7 =$	$-21 \div 7 =$
$48 \div (-4) =$	$24 \div (-4) =$	$63 \div (-7) =$	$21 \div (-7) =$

2. Describe the pattern you see in each column's answers in Problem 1, relating it to the problems' divisors and dividends. Why is this so?

3. Describe the pattern you see between the answers for Columns A and B in Problem 1(e.g., compare the first answer in Column A to the first answer in Column B; compare the second answer in Column A to the second answer in Column B). Why is this so?

4. Describe the pattern you see between the answers for Columns C and D in Problem 1. Why is this so?