1.1 Absolute Value Teacher Notes

POD: Commutative Property, Associative Property, or Multiplication Property of Zero or Multiplication Property to One. Simplify and name the property that applies to each problem.

1.) $2 + (5 + y)$

2.) $13 \cdot 0$

3.) $15 \cdot 1$

4.) $5 + 4 = 4 + 5$

Objective: Find the absolute value of an integer.

Vocabulary: The Absolute Value of a number is the distance between the number and zero on a number line. The absolute value of a is written as $|a|$

Example:

Find the Absolute Value

1.) $|-7| = 7$
2.) $|15| = 15$
3.) $|0| = 0$
4.) $-|-8|$
5.) $-|9|$
6.) $|-15|$

Order from least to greatest

7.) $|5|, -1, |4|, |-1|$
$-1, 1, 4, 5$

8.) $0, |3|, 8, |6|$
$0, 3, 6, 8$

9.) You and your friend are swimming against the current. You move forward 20 feet. Your friend is not a strong swimmer, so he moves back 9 feet. Write each amount as an integer.

1.2 Adding Integers Day 1

Teacher Notes

POD: Simplify

1.) $-|-3|$ 2.) opposite of $|5|$ 3.) $|4 + -6|$

-3 **-5** **2**

Objective: Students will add integers. Students will listen to the rules for integers and discuss how to solve several types of integer problems.

Homework: Worksheet

Rules for adding integers with the <u>SAME</u> sign:

1. Add their absolute values.
2. Give your answer the SAME sign as your integers.

Examples:

1. $45 + 32 = 77$
2. $-5 + -7 = -12$
3. $|-12 + -31| = 43$
4. $|-4| + 5 = 9$

Rules for adding integers with <u>DIFFERENT</u> signs:

1. Subtract their absolute values (biggest – smallest).
2. Give your answer the sign of the number with the greater absolute value.

Examples:

1. $7 + (-18) =$ $18 - 7 = 11 \rightarrow$ -11 because 18 was negative
2. $-6 + 2 = -4$
3. $|-4| + (-15) = -11$
4. $6 + (-10) = -4$

Challenge Problem:

1. $-250 + 200 + (-100) + 220 = 70$

1.3 Subtracting Integers Day 1 Teacher Notes

POD:

1. $|-5| + 7 = 12$
2. $|-5 + -5| = 10$
3. $8 + (-9) + 2 = 1$

Rules for subtracting integers:

1. Subtracting an integer is the SAME as adding its opposite "CHANGE, CHANGE".
2. Use adding integer rules.

Examples:

1. $4 - 6$
   $4 + -6$
   -2

2. $-2 - (-5)$
   $-2 + 5$
   3

3. $-6 - 1$
   $-6 + -1$
   -7

4. $-10 - (-7)$
   $-10 + 7$
   -3

5. $9 - |6 - 10 + 2|$
   $9 - |-2|$
   $9 - 2 = 7$

6. $|28 - 31|$
   $|-3|$
   3

Examples:

1. The highest and lowest temperatures ever recorded in Africa are 136°F and -11°F. Find the difference between these records.

$136 - (-11)$ sub -11
$136 + 11$ add 11
$147°F$

Challenge examples:

1. $|-8| - 15 + (-8) = -15$
2. $-4 - 3 + (-2) = -9$
3. $-5 - (-11) - 22 = -16$

1.4 Multiplying Integers Teacher Notes

POD:

1.) $-10 - (-7) + |-13| - 10$

$= 0$

2.) $5 + (-6) - |-8 + 2 - 4|$

$= -11$

Objective: Students will apply the rules for solving basic multiplication integer problems to several types of integer problems, including problems with exponents, order of operations and absolute value.

Rules for Multiplying integers:

1.) The product of two integers with the SAME sign is POSITIVE.
2.) The product of two integers with DIFFERENT signs is NEGATIVE.
3.) The product of an integer and zero is zero.
4.) Division by zero is undefined.

Examples:

State whether the product or quotient is **positive** or **negative**. Then solve.

1.) $-14(-2)$ → positive $= 28$

2.) $(-3)(10)$ → negative $= -30$

3.) $(-2)(-2)(2)(-2)$ → negative $= -16$

4.) $(-3)^2$ → $(-3)(-3)$ → positive $= 9$

5.) $-(3)^2$ → $(-1)(3)(3)$ → negative $= -9$

Simplify

1.) $|8(-2)| \cdot -2$

$|-16| \cdot -2$

$16 \cdot -2$

$\boxed{-32}$

2.) $(-7)^2 \cdot (-1)$

$49 \cdot (-1)$

-49

3.) $-5^2 + |-4 + 2 - 7| \cdot (-2) =$

$-25 + |-9| \cdot (-2) =$

$-25 + 9 \cdot (-2) =$

$-25 + (-18) =$

-43

6.) $(-4)(-2) - (-5)(2) =$

$8 - (-10) =$

$8 + 10 =$

18

1.5 Dividing Integers Teacher Notes

POD:

1.) $(-5)^2 + (-2)(5) =$

25 + -10 = 15

2.) $(-3)(-4) - (2)(-5) =$

12 - (-10)

12 + 10 = 22

Objective: Students will apply the rules for solving basic ivision integer problems to several types of integer problems, including problems with the order of operations and absolute value.

Rules for Dividing integers:

1.) The quotient of two integers with the SAME sign is POSITIVE.
2.) The quotient of two integers with DIFFERENT signs is NEGATIVE.
3.) The quotient of an integer and zero is zero.
4.) Division by zero is undefined.

Examples:

State whether the product or quotient is **positive** or **negative**. Then solve.

1.) $-18 \div (-3)$ → positive $= 6$

2.) $100 \div (-20)$ → negative $= -5$

3.) $(-2) \div (-2)$ → positive $= 1$

Simplify

1.) $-20 \div -5 \cdot -1 =$

$4 \cdot -1 = -4$

2.) $\frac{17}{0} =$ UNDEFINED

3.) $\frac{-10 + (-2)^3}{-3} =$

$\frac{-10 + (-8)}{-3} =$

$\frac{-18}{-3} = 6$

4.) $(-68) \div (-4) + 5 \bullet (-3)$

$17 + (-15)$

2

2.1 Comparing, Ordering, and Converting Rational Numbers into Fractions and Decimals Teacher Notes

POD: Compare. Use >, <, or = to complete each statement.

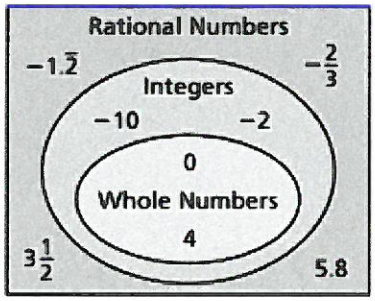
1.) $-5 > -8$ 2.) $-2 < -1.5$

Objective: Students will be able to write fractions as decimals, including repeating decimals, and write decimals as fractions in simplest form.

Vocabulary

Rational Numbers

A **rational number** is a number that can be written as $\frac{a}{b}$ where a and b are integers and $b \neq 0$.



Examples

Write the rational number as a decimal

1.) 5/6 = 8.333 2.) -3/15= -.2 3.) -5 5/11= -5.4545

Write the decimal as a fraction in simplest form

4.) .38 = 19/50 5.) -0.001 = -1/1000 6.) -11.35 = -11 7/20

Compare using >, <, or =

7.) - 2.2 _____ - 2.42 8.) -1.82 _____ -1.81 9) 15/8 _____ $1\frac{7}{8}$

> < =

Challenge Question:

1.) You receive $50 for your birthday. You buy a book for $14.95 and a baseball cap for $24.95. How much money do you have left? (Show work!)

2.2 Adding Rational Numbers Teacher Notes

POD: Compare.

1.) $\frac{3}{4} < \frac{5}{6}$ 2.) $\frac{2}{3} < \frac{4}{5}$

Objective: To add rational numbers.

Rules for adding fractions with <u>COMMON DENOMINATORS</u>:

1. Add or subtract the numerators.
2. Keep the denominator the same.
3. Simplify.

Examples:

1. $\frac{7}{8} + \frac{3}{8} = \frac{7+3}{8} = \frac{10}{8} = 1\frac{2}{8} = 1\frac{1}{4}$

Rules for adding fractions with different denominators:

1. Find their least common denominator.
2. Change the fractions according to their least common denominators.
3. Add or subtract the numerators.
4. Keep the common denominator.
5. Simplify.

Examples:

1. $\frac{1}{3} + \left(-\frac{4}{5}\right) =$

   $\frac{5}{15} + \left(-\frac{12}{15}\right) = \frac{5 + (-12)}{15} = \frac{-7}{15}$

2. $\frac{3}{4} + \frac{1}{6} =$

   $\frac{9}{12} + \frac{2}{12} = \frac{9+2}{12} = \frac{11}{12}$

Steps for Adding Mixed Numbers:

1. Write equivalent fractions using the least common denominator (LCD).
2. Follow the same steps for adding with common denominators.

Examples:

3. $1\ 2/3 + 2\ 2/3 =$
   $1 + 2 + 2/3 + 2/3 =$
   $3 + 4/3 =$
   $3 + 1 + 1/3 =$
   $4\ 1/3$

4. $3\ \frac{1}{6} + 8\ \frac{7}{8} =$
   $3\ 4/24 + 8\ 21/24 =$
   $3 + 8 + 4/24 + 21/24 =$
   $11 + 25/24 =$
   $11 + 1 + 1/24 =$
   $12\ 1/24$

Steps for Adding Rational Numbers:

Use the same steps for signs with integers.

Same sign:

1. Add the absolute value of each number and use the common sign in the answer

Different Signs:

1. Subtract the lessor of the absolute value from the greater absolute value. Take the sign of the greater absolute value for your answer.

5. $(-5.8) + 3.7 = -2.1$

6. $(-2.5) + (-3.6) = -6.1$

2.3 Subtracting Rational Numbers
Teacher Notes

Solve.

1.) $\frac{7}{12} + \frac{1}{6} = \frac{3}{4}$

2.) $\frac{1}{2} + \frac{4}{5} = 1\frac{3}{10}$

Objective: To subtract rational numbers.

Steps for Subtracting Mixed Numbers:

1. Follow the rules for adding mixed numbers.
2. Be careful when subtracting, because you may need to rename one of the mixed numbers before subtracting.

Examples:

1.) $15\frac{3}{4} - 8\frac{3}{8} =$

$15\frac{6}{8} - 8\frac{3}{8} =$

$7\frac{3}{8}$

2.) $6\frac{1}{8} - 2\frac{3}{4} =$

$6\frac{1}{8} - 2\frac{6}{8}$

$5\frac{9}{8} - 2\frac{6}{8}$

$3\frac{3}{8}$

3.) $5 - 2\frac{2}{3}$

$= 2\frac{1}{3}$

4.) $7\frac{1}{2} - 3\frac{3}{4}$

$= 3\frac{3}{4}$

5.) -15.21 - (-3.2) =
-15.21 + 3.2 =
-12.01

6.) 13.45 - (-5.21) =
13.45 + 5.21 =
18.66

Steps for Solving Word Problems:

1. Read the problem and identify the key words.
2. Pick the correct operation: add/subtract
3. Solve the problem.

Examples:

1.) Grandma spent $2\frac{2}{3}$ hours preparing for Thanksgiving on Wednesday night and $3\frac{1}{2}$ hours preparing the meal on Thursday. How much more time did Grandma spend on Thursday preparing than on Wednesday?

Operation: Subtraction

Why: How much more

$$3\frac{1}{2} - 2\frac{2}{3} = \boxed{\frac{5}{6} \text{ hours}}$$

2.) Uncle George eats $1\frac{2}{3}$ ounces of turkey. Uncle Chester eats $2\frac{3}{5}$ ounces of turkey. How much do they eat altogether?

Operation: Add

Why: Altogether

$$\frac{2}{3} + \frac{3}{5} = \frac{10}{15} + \frac{9}{15} = \frac{19}{15} = \boxed{3\frac{4}{15} \text{ ounces}}$$

3.) In one hour, a bee can fly 5 miles and a moth can fly 11 miles. How much farther can the moth fly in one hour?

Operation: Subtraction

Why: How much farther

$$11\frac{1}{6} - 5\frac{2}{3}$$

$$11\frac{1}{6} - 5\frac{4}{6}$$

$$10\frac{7}{6} - 5\frac{4}{6}$$

$$5\frac{3}{6} = \boxed{5\frac{1}{2} \text{ miles}}$$

Challenge Questions:

1.) $2\frac{3}{4} - 1\frac{5}{6} + 3\frac{2}{3} - \frac{1}{2}$

2.) Kiley's retirement party will cost $17 if she invites 17 guests. If there are 34 guests, how much will Kiley's retirement party cost?

2.4 Multiplying and Dividing Rational Numbers Teacher Notes

POD:

Tracy needs to drink $8\frac{2}{4}$ cups of water and $2\frac{1}{5}$ cups of milk every day. What is the total number of cups does she need to drink altogether? 10 and 7/10

Objective: To multiply and divide rational numbers.

Steps for Multiplying Fractions:

1. Write each number as a fraction.
2. Multiply the numerators.
3. Multiply the denominators.
4. Simplify.

***YOU DO NOT NEED TO FIND A COMMON DENOMINATOR!

***YOU MAY SIMPLIFY THE FRACTIONS BEFORE MULTIPLYING!

Examples:

1.) $\frac{5}{8} \cdot \frac{2}{3} = \frac{10}{24} = \frac{5}{12}$ OR $\frac{5}{\cancel{8}_{4}} \cdot \frac{\cancel{2}^{1}}{3} = \frac{5}{12}$

Steps for Multiplying Mixed Numbers:

1. Write the mixed numbers as improper fractions.
2. Follow the rules for multiplying fractions.

Examples:

2.) $2\frac{1}{3} \cdot 4\frac{1}{8} = \frac{7}{3} \cdot \frac{33}{8} = \frac{77}{8} = 9\frac{5}{8}$

Steps for Multiplying Decimials:

1. Multiply as though the decimals are not there.
2. Count how many decimal places are in each number.
3. Put the decimal in the final answer.

3.) -2.5 (one decimal)
x3.6 (one decimal)
150
750
900 (two decimals in the answer) = -9.00

Steps for Dividing by a Fraction:

1. Write each number as an improper fraction. Use Your Calculator!
2. Rewrite the **second** fraction as a reciprocal (FLIP!)
3. Follow the rules for multiplying fractions.

**DIVIDING A FRACTION IS THE SAME AS MULTIPLYING ITS RECIPROCAL!

Example:

1.) $9\frac{1}{2} \div 2\frac{3}{4} = \frac{19}{2} \div \frac{11}{4} = \frac{19}{2} \cdot \frac{4}{11} = \frac{38}{11} = 3\frac{5}{11}$

(2 over 4 in the second fraction; 1 under 2 in the first fraction)

Steps for Dividing Decimals:

1.) If the divisor is not a whole number, move it to the right to make it a whole number
2.) However many places you move the decimal on the divisor, do the same to the dividend.
3.) Solve/divide as normal

Example:

2.) (-0.64) ÷ (-0.8) =