

Basic Training



This lesson contains review of the following eighth grade math topics:

- Adding Rational Numbers
- Subtracting Rational Numbers
- Multiplying Rational Numbers
- Dividing Rational Numbers
- Absolute Value
- Order of Operations
- Evaluating Expressions

Basic Terms

Integers: whole numbers (0, 1, 2, 3...) and their negatives (-1, -2, -3...)

Rational numbers: any number that can be written as a fraction

Operations: adding, subtracting, multiplying, dividing

Expression: no equal sign

Equation: has an equal sign

Adding Rationals:

- If the signs are the same, add the numbers and then keep the same sign for your answer.

"Same sign add and keep..."

For Example:

1. $3 + 7 = 10$

2. $-3 + -7 = -10$

3. $-12 + -3 + -2 = -15 + -2 = -17$

4. $-10.2 + -2.3 = -12.5$

"Different sign, subtract.
Take the sign of the higher
number
Then you'll be exact!"

- If the signs are different, SUBTRACT

Keep the sign of the higher number.

5. $-2 + 7 = \boxed{5}$

7. $-2.5 + 1.3 = \boxed{-1.2}$

6. $\frac{1 + -5 + -2}{-4 + -2} = \boxed{-6}$

8. $112.1 + -100 = \boxed{12.1}$

Subtracting Rationals:

If the operation is subtracting, you Add the opposite.
Then, follow the rules for adding.

For Example:

1. $3 + 7 = \boxed{10}$

2. $-3 + 7 = \boxed{4}$

3. $-12 + 3 + 2 = \boxed{-7}$

4. $-10.2 + 2.3 = -7.9$

$$\begin{array}{r} 9 \\ -10.2 \\ -2.3 \\ \hline -7.9 \end{array}$$

5. $-\frac{1}{2} - -\frac{2}{3}$

Change the minus to a plus
Change the sign of the next
Then all ya do is add 'em up
As if it were a plus



Practice Subtracting

1. $-2 - -4$

8. $-2 - -3 - 4$

2. $3 - 5 - -1$

9. $-1.2 - -3.4$

3. $-5 - 16 + -2$

10. $-1 - 1.1$

4. $-3 + 13 - -4$

11. $\frac{2}{3} - -\frac{1}{2}$

5. $12 - -22$

12. $|6 - -2| - |-1 + -4|$

6. $-234 - -10$

13. $2 - \frac{2}{5} - -\frac{3}{5}$

7. $10 - -17 + -1$

Multiplying Rationals:

If the signs are same, Then the answer is positive

If the signs are different, Then the answer is negative

For example:

1. $-3(-2) = 6$

2. $(4)(-2) = -8$

3. $(-2)(1 - 4) =$

4. $(-1)(1 + -2)(-1 + 1) =$

Dividing Rationals:

If the signs are same, Then the answer is positive

If the signs are different, Then the answer is negative

5. $-5 \div -1 = 5$

6. $\frac{5}{-15} = -\frac{1}{3}$

7. $\frac{-3-5}{2-10}$

8. $\frac{3^2}{-3}$

Absolute Value

Absolute Value: The positive value of a number

How to solve Absolute Value Problems: Treat absolute value like positive parenthesis

Practice Problems:

Try the following problems:

1. Find the value of the expression $|-13| = 13$

2. Simplify: $-|-12| = -12$

3. Simplify: $|-2(4)| = 8$
 -8

4. Is $7 + |x|$ (always, sometimes, or never) > 6 . Explain!

7 + a positive is always greater than 6

5. Simplify: $|-4 + 5| + |-12|$

$$\begin{aligned} &|-4 + 5| + |-12| \\ &|1| + 12 \\ &1 + 12 = \boxed{13} \end{aligned}$$

6. Simplify: $|-8| + |2| - |-2|$

$$\begin{aligned} &8 + 2 - 2 \\ &10 - 2 \\ &8 \end{aligned}$$

7. $-|7(-2) - 3|$

$$\begin{aligned} &-|14 + 3| \\ &-|17| = \\ &\boxed{-17} \end{aligned}$$

10. $(2 + 6) - |2^3 - 3(4)|$

$$\begin{aligned} &8 - |8 + 12| \\ &8 - |20| \\ &8 - 20 = \boxed{-12} \end{aligned}$$

8. $|-2| + |9| - |2 - 16|$

$$\begin{aligned} &2 + 9 - |-14| \\ &2 + 9 - 14 \\ &11 - 14 = \boxed{-3} \end{aligned}$$

11. $\frac{-|-2+5|}{|-2|}$

$$\frac{-|3|}{2} = \frac{-3}{2}$$

9. $|-2| \cdot |-3| + |3 + 5|^2$

$$\begin{aligned} &2 \cdot 3 + |8|^2 \\ &2 \cdot 3 + 2 \cdot 2 \\ &6 + 4 = 10 \end{aligned}$$

12. $||-3| - |4|| + (-6 + 2)$

$$\begin{aligned} &|3 - 4| + -4 \\ &|-1| + -4 \\ &1 - 4 = \boxed{-3} \end{aligned}$$

Order of Operations Review

Order of Operations: order you have to follow to simplify expressions

Ways to remember Order of Operations:

PEMDAS:

P: parenthesis

E: exponents

MD: mult. and dividing (L + R)

AS: adding and subtracting (L + R)

Please Excuse My Dear Aunt Sally



