9-11-17

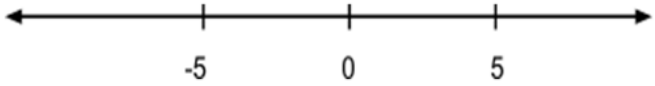
Aim: SWBAT evaluate absolute value and translate expressions AND define and identify properties of addition and multiplication.

HW: Packet Pg. 9

Do Now: Packet Pg. 6 # 13 - 18

Notes:

Opposite numbers are the same distance from zero on a number line in opposite directions. For example 5 and -5 are opposites. They are both 5 spaces away from zero.



Zero is a special integer because it is neither positive nor negative.

Why is zero an integer? because it's a whole #

Comparing Integers : > is greater than < is less than

Examples: 36 > 12 *is read* "36 *is greater than* 12"
15 < 29 is read "15 is *less than* 29"

The number ***farther right*** on the number line is the ***larger*** number.

Ex. 15 < 25 92 > 63 0 < 12

-5 < 0 -5 > -18 -12 < 12

Ordering Integers: Order from least to greatest.

-5, -9, 0, -3 -9, -5, -3, 0 -2, 7, -5, -1 -5, -2, -1, 7

****The three questions most often missed.**

*1. Name a number that is not an integer? $\frac{1}{2}$

2. Name the largest negative integer. -1

3. Name the smallest positive integer. 1

Absolute Value measures the distance a number is from zero on the number line. Distance is always POSITIVE, therefore, Absolute Value is ALWAYS positive.

The symbol for absolute value is "| |."

|4| " What is the absolute value of 4?" |4| = 4

|-4| "What is the absolute value of -4?" |-4| = 4

True or False -4 = 4 FALSE |-4| = |4| TRUE (4 = 4)

The negative symbol "-" means **opposite**. For example the "opposite of 4" is -4.

Simplify the expression. (Start from the inside and work it out)

* 1) - (-4) 4 2) - (-(-4)) -4 3) -[-(-(-4))] 4 4) -(-(-(-(-4)) -4

"The opp. of neg. 4"

5) -|-4| -4 6) - (- |-4|) 4 7) - - - |-4| -4

subtraction ← $5 - 2$

negative ← -3

"the opposite of x" $-x$

HOMEWORK – SETS OF NUMBERS

****Use the chart we made in class to help you answer these questions!****

Answer the following with….	SOMETIMES	ALWAYS	NEVER
1) Counting Numbers are Whole Numbers.	S	(A)	N
2) Whole Numbers are Real Numbers.	S	(A)	N
3) Counting Numbers are Integers.	S	(A)	N
4) Integers are Counting Numbers.	(S)	A	N
5) Counting Numbers are Rational..	S	(A)	N
6) Real Numbers are Irrational.	(S)	A	N
7) Integers are Rational Numbers.	S	(A)	N
8) Rational Numbers are Whole Numbers.	(S)	A	N
9) Whole Numbers are Rational.	S	(A)	N
10) Rational Numbers are Irrational.	S	A	(N)

State ALL of the sets of numbers that each of the following belongs to:

	Real	Irrational	Rational	Integer	Whole	Natural
11) 0	R, Rat., I, W					
12) −5	R, Rat, I					
13) 3.421123…	R, Irr					
14) 2.56	R, Rat					
15) 20	R, Rat, I, W, N					
16) $-\frac{3}{5}$	R, Rat.					
17) $0.\overline{6}$	R, Rat.					

4

Write the OPPOSITE and then ABSOLUTE VALUE of each integer:

18) 7 -7 7

19) -25 25 25

20) 106 -106 106

21) 0 0 0

Complete the Statement with < or >.

22) -6 < 4

23) -2 > -4

24) 0 < 8

Match the integer expression with the verbal expression:

E 25) -|12|

D 26) |-12|

C 27) -|-12|

A 28) -(-12)

B 29) |12|

A. the opposite of negative twelve

B. the absolute value of twelve

C. the opposite of the absolute value of negative twelve

D. the absolute value of negative twelve

E. the opposite of the absolute value of twelve

Simplify the expression:

30) -(-9) 9

31) |-16| 16

32) -|-16| -16

The table below shows the distances of the runners from the finish line when the winner won the race. Use the table to answer Questions 33 – 35.

Runner	Distance (ft)
Sarah	-16
Beth	-2
Juanita	0
Tamika	-9
Ingrid	-36

33) Who won the race? Juanita

34) Who finished further back, Sarah or Tamika? Sarah

35) Arrange the girls' names in order from first-place to last-place finish.

(Hint: use a number line to help you)

Juanita (1st Place) Beth (2nd Place) Tamiki (3rd Place) Sarah (4th Place) Ingrid (5th Place)

AIM: SWBAT identify properties of addition and multiplication and use the properties to add integers.

"DO NOW"

Write the opposite of each integer.

1) 3 _____ 2) -5 _____ 3) -7 _____ 4) 9 _____

Find the absolute value.

5) |-12|_____ 6) |-4|_____ 7) |9|_____ 8) - | 18| _____

Compare using < or >.

9) 8 _____ -6 10) -7 _____ -4 11) -9 _____ 5 12) -7 _____ -3

Order from least to greatest.

13) -1, -6, 0, -3, -5_____ 14) -18, -20, -15, -17_____

State ALL the sets of numbers each belongs to.

15) -20 _____

16) $-\frac{1}{2}$ _____

17) $0.\overline{5}$ _____

18) π _____

Properties of Addition and Multiplication

1) **Commutative Property of addition and multiplication:** (Commutative, x; Commutative, +)
Changing the order of the numbers without changing the answer. **(#'s commute)**

Examples: A) $2 + 3 = 3 + 2$ B) $4 \cdot 5 = 5 \cdot 4$

2) **Associative Property of addition and multiplication:** (Associative, x; Associative, +)
Moving the **grouping** symbols without changing the answer.

Examples: A) $6 + (2 + 3) = (6 + 2) + 3$ B) $7 \cdot (4 \cdot 6) = (7 \cdot 4) \cdot 6$

3) **Additive Identity Property: (Identity, +) Identity of # does not change**
Any number plus zero equals that number. ***The identity element of addition is zero.***

Examples: A) $9 + 0 = 9$ B) $x + 0 = x$

4) **Multiplicative Identity Property: (Identity, x) Identity of # does not change**
Any number times one is that number. **** The identity element of multiplication is one.***

Examples: A) $4 \cdot 1 = 4$ B) $x \cdot 1 = x$

5) **Additive Inverse Property: (Inverse, +) (Opposites)**
For every number, a, $a + -a = 0$. ***Remember: Zero is the identity element***

Examples: A) $9 + -9 = 0$ B) $-x + x = 0$

6) **Multiplicative Inverse Property: (Inverse, x) (Reciprocal)**
For every number, a, $a \cdot \frac{1}{a} = 1$ ***Remember: One is the identity element***

Examples: A) $4 \cdot \frac{1}{4} = 1$ B) $x \cdot \frac{1}{x} = 1$

7) **Multiplicative Property of Zero: (Zero, x) (Everything becomes zero)**
Any number times zero is zero

Examples: A) $10 \cdot 0 = 0$ B) $x \cdot 0 = 0$

8) **Distributive Property (over addition or subtraction)**
Multiplying a group by a number (term)

Example: A) $4(x + y) = 4x + 4y$ B) $2(3x + 4) = 2 \cdot 3x + 2 \cdot 4$
$= 6x + 8$

NOTE: You can also use the distributive property backwards by factoring out the GCF
Example: $4x + 14 = 2(2x + 7)$

7

Name the property for each of the following:

1) $(13 + 7) + 8 = 13 + (7 + 8)$ _____

2) $0 \bullet (x + 3) = 0$ _____

3) $9 \bullet 5 = 5 \bullet 9$ _____

4) $(62 + 3) + 0 = (62 + 3)$ _____

5) $2(4x + 9) = 8x + 18$ _____

6) $(19 + 8) + 6 = (8 + 19) + 6$ _____

7) $(2 \bullet 3) \bullet 7 = 2 \bullet (3 \bullet 7)$ _____

8) $56 \bullet 1 = 56$ _____

9) $2x + 6y = 2(x + 3y)$ _____

10) $7 \bullet \frac{1}{7} = 1$ _____

11) $-6 + (3 \bullet 8) = -6 + (8 \bullet 3)$ _____

12) $-15 + 15 = 0$ _____

Adding Integers

Adding integers means adding with both positive and negative numbers (the whole numbers and their opposites). Before we discuss any rules about adding integers, let's explore . . .

Let's look at some examples together:

1) $-2 + 2 =$ _____ 2) $-4 + 0 =$ _____ 3) $-5 + 5 =$ _____

4) $-2 + 5 =$ _____ 5) $-5 + 2 =$ _____ 6) $-2 + -5 =$ _____

7) $-2 + 3 =$ _____ 8) $2 + -3 =$ _____ 9) $-2 + -3 =$ _____

10) $-6 + 1 =$ _____ 11) $-1 + 6 =$ _____ 12) $-6 + -1 =$ _____

HOMEWORK – Properties & Introduction to Adding Integers

State the name of the property that is shown.

1) $(x + 9) + 1 = x + (9 + 1)$ 1) _____

2) $1 \bullet x = x$ 2) _____

3) $(2 + 3) + 5 = 2 + (3 + 5)$ 3) _____

4) $(12 + 9) + 15 = (9 + 12) + 15$ 4) _____

5) $(2 + 7) \bullet 0 = 0$ 5) _____

6) $12 \bullet (7 \bullet 15) = (12 \bullet 7) \bullet 15$ 6) _____

7) $0 + (9 + 1) = 9 + 1$ 7) _____

8) $3(4x + 9) = 12x + 27$ 8) _____

9) $r \bullet 1 = r$ 9) _____

10) $(8 \bullet 6) \bullet 9 = 8 \bullet (6 \bullet 9)$ 10) _____

11) $106 \bullet 0 = 0$ 11) _____

12) $4(a + b) = 4a + 4b$ 12) _____

13) $-y + y = 0$ 13) _____

14) $(2 + y) + 8 = 8 + (2 + y)$ 14) _____

15) $c \bullet \frac{1}{c} = 1$ 15) _____

16) $(8 \bullet 6) + 9 = (6 \bullet 8) + 9$ 16) _____

17) $-11 + 32 =$ _____ 18) $8 + -8 =$ ____ 19) $-78 - 15 =$ _____ 20) $-25 + 20 =$ _____

9