

ADDING & SUBTRACTING ON THE NUMBER LINE

Name: Key Date: _____ Period: _____

SECTION 2.3 ADDING AND SUBTRACTING LARGER NUMBERS

Big Ideas: What patterns do we see in the car model that can be extended to discover general rules for adding and subtracting large integers?

EXPLORATION: WORKING WITH LARGER NUMBERS

1. Find the following sums.

a. $12 + 17$
 29

c. $19 + 28$
 47

b. $-12 + (-17)$
 -29

d. $-19 + (-28)$
 -47

What do you observe? Is there a simple way of combining two integers that have the same sign, both positive, or both negative?

*add the absolute values & keep the sign.
 $x + y$ has the same absolute value of $-x + (-y)$.*

Write a rule that explains the process. Use your rule for problem 2:

Add the absolute values and keep the sign that they share

2. Find the following sums.

a. $13 + 19$
 $|13| + |19| = 32$
keep + sign

c. $16 + 13$ $|16| + |13| = 29$
keep + sign

b. $-13 + (-19)$
 $|13| + |19| = 32$

d. $-16 + (-13)$
 $|16| + |13| = 29$

keep - sign -32

19 keep - sign -29

3. Look for a pattern in computing the following sums.

a. $-13 + 19$

6

c. $26 + (-33)$

-7

b. $13 + (-19)$

-6

d. $-26 + 33$

7

Try writing a rule for sums of integers with opposite signs.

Ignore the signs, subtract, then apply the signs

How can you use absolute values to describe what you have done?

Find the difference of the absolute values and keep the sign of the number with the larger absolute value.

4. Use your new rule to compute the following sums.

a. $28 + (-33)$

← larger absolute value

$| -33 | - | 28 | = 5$

-5

c. $-45 + 32$

← larger absolute value

$| -45 | - | 32 |$

$45 - 32 = 13$

-13

b. $-28 + 33$

$| 33 | - | -28 | = 33 - 28 = 5$

5

d. $45 + (-32)$

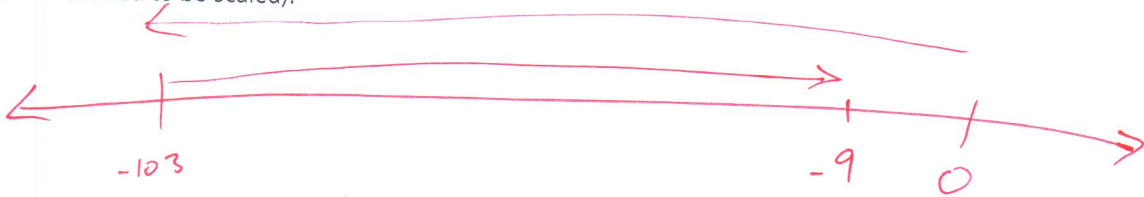
$| 45 | - | -32 |$

$45 - 32 = 13$

13

EXAMPLE 1

Find the sum of $-103 + 94$. Use a number line to explain how you found your answer (your number line does not need to be scaled).



$-103 + 94 = -9$

EXAMPLE 2

- a. During a football game, David gains 13 yards on one play and gains 22 yards on the next play. What is his net yardage? **Net Yardage** is the total number of yards gained or lost at the end of a series of plays.

$$13 + 22 = 35 \text{ yards}$$

- b. On the next series of downs, he gains 16 yards on the first play and loses 9 yards the second play. What is his net yardage this time?

$$16 \text{ yards} - 9 \text{ yards} = 7 \text{ yards}$$

PRACTICE EXERCISES

Write an addition sentence to represent these problems and solve.

1. The price of gold increased \$27 per ounce during March and decreased \$32 per ounce during April. What was the net gain in price per ounce during these two months?

$$\$27 + (-\$32) = -\$5$$

$$\begin{aligned} &|-32| - |27| \\ &= 32 - 27 \\ &= 5 \end{aligned}$$

the number with the
keep sign of larger absolute value

2. In Juneau, Alaska, the temperature on January 10th was -23°F . The next day the temperature rose 16°F . What was the temperature on January 11th?

$$-23^{\circ}\text{F} + 16^{\circ}\text{F}$$

$$|-23| - |16|$$

$$= 23 - 16$$

$$= 7$$

keep sign of number with larger
absolute value

$$\textcircled{-7^{\circ}\text{F}}$$

SUMMARY (What I learned today)
