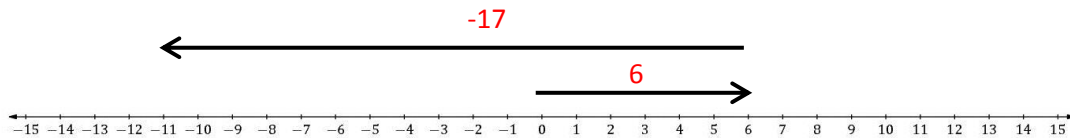


Mid Module 2 Study Guide

Directions: Show all work for full credit.

1. Raphael used a number line to add. He started counting at 6 and then he counted until he was on the number -11 on the number line.
 - a. If Raphael is modeling addition, what number did he add to 6? Use the number line below to model your answer.



He added **-17** to 6.

- b. Write a real-world story problem that would fit this situation.

Answers may vary.

I hiked 6 feet up a mountain, then I descended 17 feet. I ended 11 feet below where I started.

I had \$6 and put it in the bank. I forgot about the monthly bank fee of \$17. Now I have -\$11.

The temperature was 6°F, then it dropped 17° and ended at -11°F.

The quarterback threw the ball for 6 yards. On the next play, he was sacked and lost 17 yards. The team's field position was 11 yards behind where it started on the first play.

- c. Use absolute value to express the **distance** between 6 and -11.

$$|p - q| = |6 - (-11)| = |6 + 11| = \mathbf{17} \quad \text{OR} \quad |-11 - 6| = |-11 + (-6)| = |-17| = \mathbf{17}$$

Name: _____ ANSWER KEY _____ Date: _____

2. What value of x will make the equation a true statement? Explain how you arrived at your solution.

$$-\frac{5}{9} + \frac{9}{5} + x = 0$$

1. Add the two fractions together
2. The value of x that is the additive inverse, or opposite of that number is the number that will make the equation true.

$$-\frac{5}{9} + \frac{9}{5} = 1\frac{11}{45}$$

Therefore, x must equal $-1\frac{11}{45}$ because that is the additive inverse of $1\frac{11}{45}$ and additive inverses add together to equal zero.

3. Every month, Mr. Williams pays his satellite radio subscription through automatic monthly payments (withdrawals) from his savings account. He pays the same amount on his subscription each month. At the end of the year, his savings account balance changed by $-\$690$ from payments made on his radio subscription.
- a. What is the **change in** Mr. Williams' savings account balance each month due to his radio subscription?

$$-\$690 / 12 = \mathbf{-\$57.50}$$

- b. Describe the total change to Mr. Williams' savings account balance after making six monthly payments on his radio subscription. **Model your answer using a number sentence.**

$$(-\$57.50)(6) = \mathbf{-\$345}$$

4. Miranda and Courtney are playing the Integer Card Game. The cards in Miranda's hand are shown below.

Miranda's Hand

5, 9, -2, -11

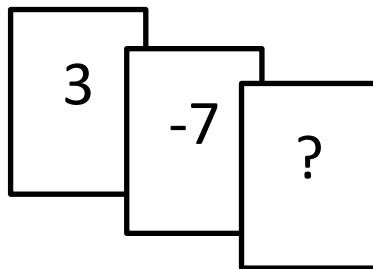
- a. What is the total score of Miranda's hand? Support your answer by showing your work.

$$5 + 9 + (-2) + (-11) = 1$$

- b. Miranda picks up two more cards, but they do not affect her overall point total. **State the value of each of the two cards and tell why they do not affect her overall point total.**

Any cards that are additive inverses of each other since additive inverses add together to equal zero. Ex: $-1 + 1 = 0$

- c. Complete Miranda's new hand to make her total score equal zero. What must be the value of the ? card? Explain how you arrived at your answer.



Since $3 + (-7) = -4$, the ? card must be a 4 in order for her total score to equal zero. I know this because -4 and 4 are additive inverses which add together to equal zero.

Name: _____ ANSWER KEY _____ Date: _____

5. Mitchell's father bought him a 18-foot board to cut into shelves for his clubhouse. Mitchell plans to cut the board into 13 equal size lengths for his shelves.
- a. The saw blade that Mitchell will use to cut the board will change the length of the board by -0.2 inches for each cut. How will this affect the total length of the board?

$$(-0.2)(12) = -2.4 \text{ inches lost}$$

$$18 \text{ feet} * (12 \text{ in/1ft}) = 216 \text{ inches}$$

$$216 - 2.4 = 213.6 \text{ inches}$$

The new length of the board (after making the cuts) will be **213.6 inches**.

OR The usable length of the board will be 2.6 inches shorter than 18 feet.

- b. After making his cuts, what will the EXACT length of each shelf be?

$$213.6 \text{ inches} / 13 = \mathbf{16.4 \text{ inches}}$$

(Since it asks for the exact length and this is NOT a terminating or repeating decimal, you may round to the nearest tenth. **HOWEVER, if this was a repeating decimal, you would to indicate which digit(s) repeat**)

Name: _____ ANSWER KEY _____ Date: _____

6. Lucy and Lily were playing the Integer Card Game like the one you played in class. They were practicing adding and subtracting integers. Lucy had a score of -18. Lily took away one of Lucy's cards. She showed it to her. It was a -10. Lily recalculated her score to be -8, but Lucy disagreed. She said that her score should be -28 instead. Read their conversation, and answer the question below.

LUCY: "No, Lily, removing a negative card means the same thing as subtracting a positive. So, negative 18 minus negative 10 is negative 28."

LILY: "It does not! Removing a negative card is the same as adding the same positive card. My score will go up. Negative 18 minus negative 10 is negative 8."

Based on their disagreement, who, if anyone, is right? Explain.

Lily is correct because when you subtract a negative 10, you Keep Change Change. The subtraction becomes addition and the -10 becomes a positive 10. $-18 - (-10) = -18 + 10 = -8$. When you remove a negative card, your score will increase.

7. The table below shows the temperature changes Monday morning in Minneapolis, Minnesota over a 3-hour period after a cold front came through.

- a. If the beginning temperature was -18°F at 7:00 a.m., what was the temperature at 10:00 a.m.?

Change in Temperature	
7:00 a.m. – 8:00 a.m.	-5°F
8:00 a.m. – 9:00 a.m.	-2°F
9:00 a.m. – 10:00 a.m.	4°F

$$-18 + (-5) + (-2) + 4 = -21^{\circ}$$

The temp at 10:00 a.m. was -21°F

- b. The same cold front hit Lawrenceville, New York the next morning. The temperature dropped by 9°F each hour from 7 a.m. to 10 a.m. What was the beginning temperature at 7 a.m. if the temperature at 10 a.m. was -7°F ?

Time	Temp
10:00	-7°
9:00	2°
8:00	11°
7:00	20°

OR, use a formula

$$-7 - (-9)(3) = -7 + 27 = 20^{\circ}$$

OR, use a number line

- c. In answering part (b), Savannah and Billy used different methods. Savannah said her method involved multiplication, while Billy said he did not use multiplication. Both students arrived at the correct answer. How is this possible? Explain.

The temperature change was the same for each hour so you can multiply -9 by three hours or add -9 three times. This is possible since multiplication is repeated addition. $-9 + (-9) + (-9) = -27$ is the same as $(-9)(3) = -27$.