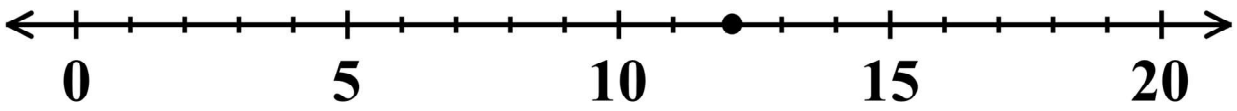
Name: _____ Date: _____

ADDING AND SUBTRACTING GRAPHICALLY
N-GEN MATH® 7

Addition and subtraction of signed numbers can be understood when viewed on a number line. Let's first start with addition and subtraction that you are comfortable with.

***Exercise* #1:** The following number line has a point located at 12 as shown. Answer the following questions using this number line.

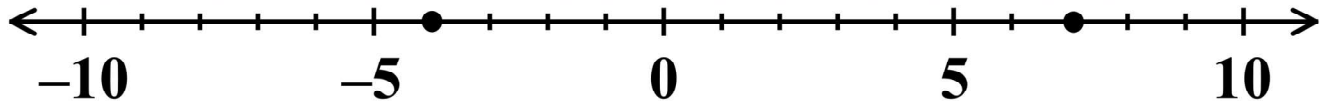


(a) What is the result of $12+6$? How can we show this using the point at 12 on the number line?

(b) What is the result of $12-7$? How can you show this using the point 12 on the number line?

So, when we add a positive number it moves a point that many units to the right and when we subtract it moves a point that many units left. Let's continue to see if this pattern holds when we include negative numbers.

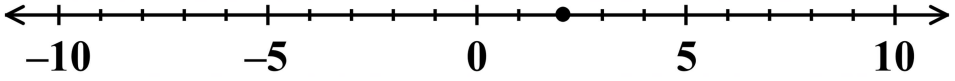
***Exercise* #2:** Points are plotted at -4 and 7 on the number line below. Answer the following questions.



(a) What is the result of $7-10$? Show this on the number line.

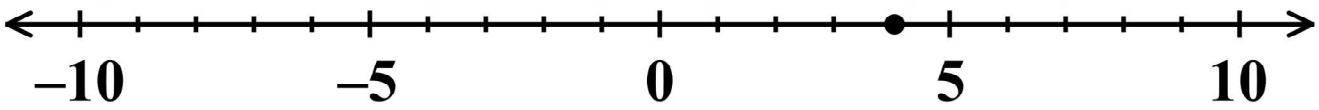
(b) What is the result of $-4+10$? Show this on the number line.

(c) What two numbers would lie 7 units away from 2 on the number line? Show calculations that lead to your answers and illustrate on the number line below.



Adding and subtracting **negative numbers** works exactly in the reverse direction.

***Exercise* #3:** A point is located at 4 on the number line below. Do the following.

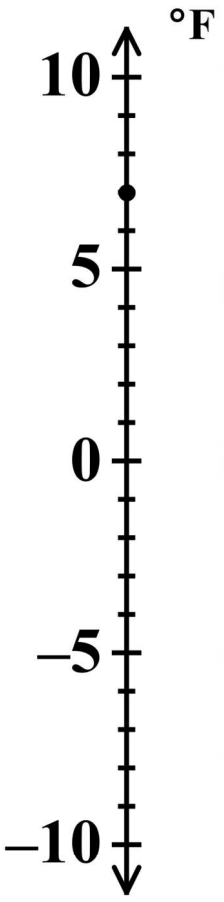


(a) What is $4+-9$? Plot this point. What effect did adding a negative number have on the location of the point?

(b) What is $4-(-3)$? Plot this point. What effect did subtracting a negative number have on the location of the point?

Being able to use number lines can help us think about operations with positives and negatives. Sometimes there are even good analogies in real life.

***Exercise* #4:** A cold night in January starts with a temperature of 7 °F as shown on the diagram.



(a) Overnight the temperature drops by 13 °F. Give an expression that gives the temperature in the morning, evaluate the expression, and plot the point on the number line.

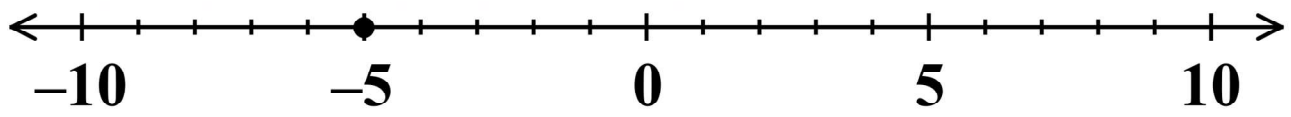
(b) From the morning until noon, the temperature then rises by 8 °F. Give an expression that calculates the temperature at noon, evaluate the expression, and plot on the number line.

Name: _____ Date: _____

ADDING AND SUBTRACTING GRAPHICALLY
N-GEN MATH® 7 HOMEWORK

FLUENCY

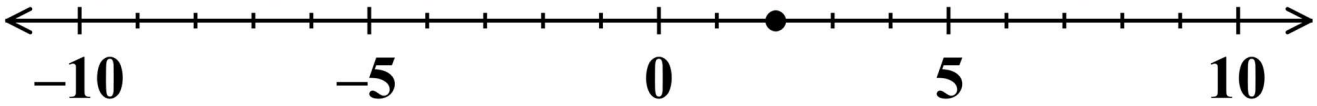
1. The number -5 is plotted on the number line below.



Illustrate how you can find the result of the sum $-5+11$ using the number line. State and plot the result.

$-5+11=$ _____

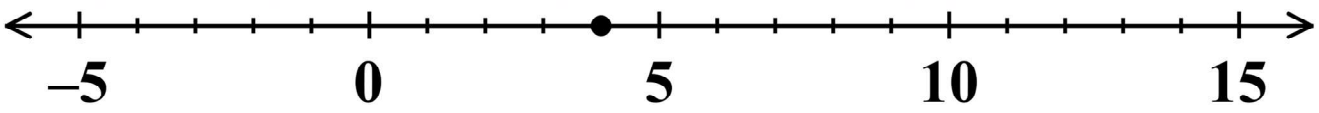
2. The number 2 is plotted on the number line below.



Illustrate how you can find the result of the difference $2-9$ using the number. State and plot the result.

$2-9=$ _____

3. The number 4 is plotted on the number line below.



(a) Plot all points that are a distance of 7 units from 4. What are their values?

(b) What two numbers can you add to 4 to get your answers from (a)? Fill in the statements below to justify.

$4+$ _____ $=$ _____ $4+$ _____ $=$ _____

4. Which of the following expressions would *not* result in a number 8 units to the left of the number 5 on a horizontal number line?

   (1) $5-8$ (3) $5+-8$

   (2) $-(8-5)$ (4) $5-(-8)$

_____

5. If a represents a number on the real number line and the result of $a+b$ is located to the left of a then which of the following must be true about the value of b?

   (1) b is positive

   (2) b is negative

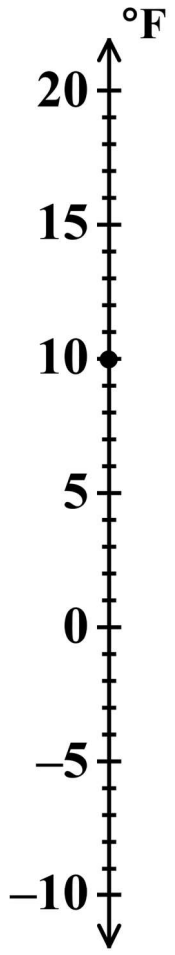
   (3) b is zero

   (4) b is less than a

_____

USING YOUR MATH

6. The temperature at sunset is 10 °F as plotted.



   (a) From sunset to sunrise the temperature falls 17 °F. Set up and evaluate a subtraction problem that gives the temperature at sunrise. Show this temperature drop on the number line.

   (b) From the time of sunrise in (a), the temperature rises to 0 °F at 2:00 p.m. How much did it rise? Show an addition problem below that justifies your answer.

   _____ + _____ = 0