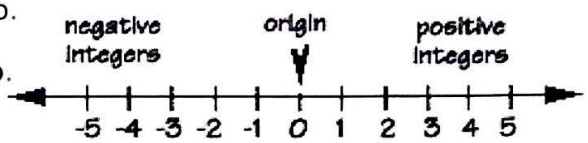
NOTES: 3.1 (Unit 3, Lesson 1) Name: Key

Integers and Absolute Value

- An integer is any positive or negative whole number from the set {...,–4,–3 –2 –1, 0, 1, 2, 3, 4,...}
- Negative integers are integers LESS than zero.
- Positive integers are integers MORE than zero.
- Zero is neither negative nor positive.



These numbers are **Integers**: 0, 3, –100, 432, $\frac{10}{2}$*, $-\frac{6}{3}$**, 987,654,321

These numbers are **not Integers**: 7.2, $\frac{10}{4}$, $-\frac{5}{8}$, –3.7

* $\frac{10}{2}$ simplifies to 5, which is an integer

** $-\frac{6}{3}$ simplifies to -2, which is an integer

Write Integers for Real-Life Situations

a gain of 5 yards on the first down. +5 yards

a temperature of 10 degrees below zero. -10°

6 feet below sea level -6 ft

a $35 withdrawal -$35

You Try! Underline key words

a. Lost 6 points -6 pts

b. 3 stokes below par -3 strokes

c. $5 deposit +$5

d. A loss of $30 -$30

e. descend 20 meters -20 m

f. 12 centimeters longer +12 cm

h. 5000 feet above sea level +5000 ft

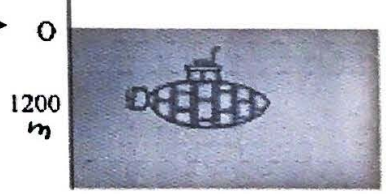
i. 7 inches below normal -7 in

j. $5 off the original price -$5

k. ascend 100 meters +100 m

l. 10 strokes above par +10 strokes

m. 6 yard loss -6 yd



g. How far away is the plane from the submarine? 6200 m

5000m + 1200m = 6200m

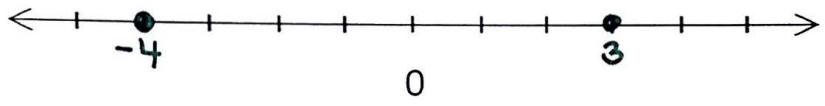
h. 100 meters ascend and then 20 meters descend

+100m
- 20m
80 m

Key

Graph an Integer on a Number Line

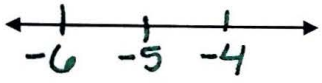
Graph –4 on a number line. Then graph 3 on a number line. Which one is greater????



Compare Integers

Use the > , <, or = to make a true sentence.

–6 < –4



a. 3 > –5 **b.** –5 < 0

c. 6 > –1 **d.** –23 > –29

Positive numbers are always GREATER than **negative** numbers.

Zero is always LESS than a positive number, but GREATER than a negative number.

When comparing **two negative** numbers, imagine them on a number line. The negative number closer to the zero is always GREATER.

Order Integers

SCIENCE The average surface temperatures of Jupiter, Mars, Earth, and the Moon are shown in the table. Order the temperatures from least to greatest (in ascending order). -162, -81, -10, 59

	Name	Average Surface Temperature (°F)
1	Jupiter	–162
3	Moon	–10
2	Mars	–81
4	Earth	59

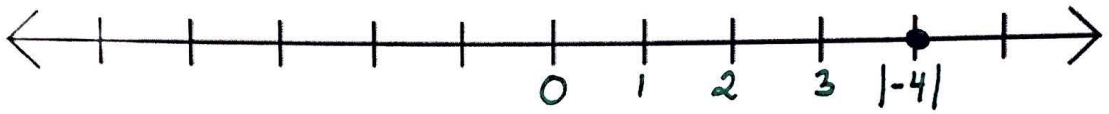
Absolute Value

- The absolute value of an integer is the distance that number is from zero on a number line. (# of steps from zero)
- The absolute value of any number is **ALWAYS** positive, or +.

$$|14| = |-14| = 14$$

Key

Evaluate and Graph the expression. $|-4|$ = 4 steps from 0



a. $|6| = 6$

b. $|4| + |-4| = 4 + 4 = 8$

c. $|-7| - |2| + |-1| = 7 - 2 + 1 = 6$

d. $|-5| = 5$

e. $|9| - |-5| = 9 - 5 = 4$

f. $|-13| + |-7| = 13 + 7 = 20$

Record the absolute value for each integer.

1) $|-8| = 8$

2) $|5| = 5$

3) $|15| = 15$

4) $|-13| = 13$

Evaluate the problems below.

5) $|-22| + 9 = 22 + 9 = 31$

6) $|10| - |-4| = 10 - 4 = 6$

7) $|7| \cdot 9 \cdot |0| = 7 \cdot 9 \cdot 0 = 0$

8) $|-100| \div |5| = 100 \div 5 = 20$

Compare, using <, >, or =

9) 6 (<) $|-14|$ (14)

10) $|-17|$ (=) $|17|$ (17 17)

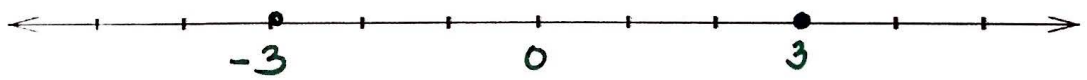
Order the following from GREATEST to LEAST (descending order).

11) $-32, -10, |16|, |-3|, |-30|, 25$ (16, 3, 30) $\quad |-30|, 25, |16|, |-3|, -10, -32$

Additive Inverses

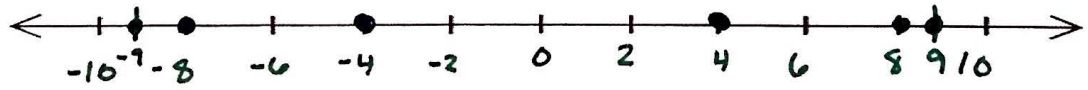
Additive inverses are numbers that are the Same distance from zero in opposite directions on the number line. When additive inverses are combined through addition, the sum is ZERO.

Write the Additive Inverse of 3. -3 Graph 3 and its additive inverse on the number line.



Write the additive inverse of each number. Graph each pair on the number line.

a. $-4, 4$ b. $8, -8$ c. $-9, 9$



Practice (1.1) Name: Key

Write an integer to represent the situation below:

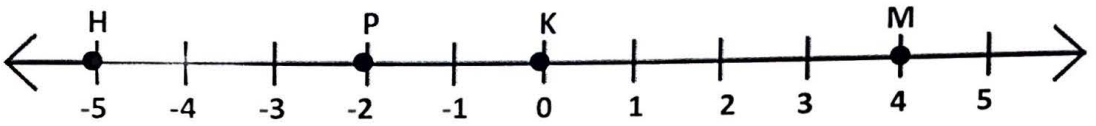
1) sea level 0

2) a withdraw of 42 dollars $-\$42$

3) 14 degrees below 0 $-14°$

4) an increase in height of 3 inches $+3$ in

Write the value represented by the point for each letter. Then find its additive inverse (a.i.).



5) K 0, a.i.: 0

6) H -5, a.i: 5

7) M 4, a.i: -4

8) P -2, a.i: 2

Evaluate

9) $|29| = 29$

10) $|-15| = 15$

11) $|9| - |-2| = 9-2=7$

12) $|-50| + |-7| = 50+7=57$

13) What is the sum of the absolute values of -14 and 10? $|-14|+|10|=14+10=\boxed{24}$

14) $|-30| - |-4|+|5| = 30-4+5=26+5=\boxed{31}$

Compare using >, <, or =

15) $-32 \,(<)\, 14$

16) $11 \,(>)\, -4$

17) $|-9| \,(=)\, |9|$

Order the following from least to greatest (ascending order).

18) $-8,\ 10,\ 2,\ -13,\ -5,\ 3$ $-13, -8, -5, 2, 3, 10$

19) $-22,\ -11,\ |11|,\ |0|,\ |-14|,\ 22,\ -10$ $-22, -11, -10, |0|, |11|, |-14|, 22$

$+11 \quad 0 \quad +14$

Order the following from greatest to least (descending order).

20) $-9,\ -19,\ 19,\ 99,\ -29,\ -99,\ 29$ $99, 29, 19, -9, -19, -29, -99$

??? Why is it better to have a positive bank account rather than a negative bank account?

Answers will vary