Applied Algebra 2.1

Graph integers on a number line
Compare integers
Order integers

number line
positive number
zero
negative number   − 0 +
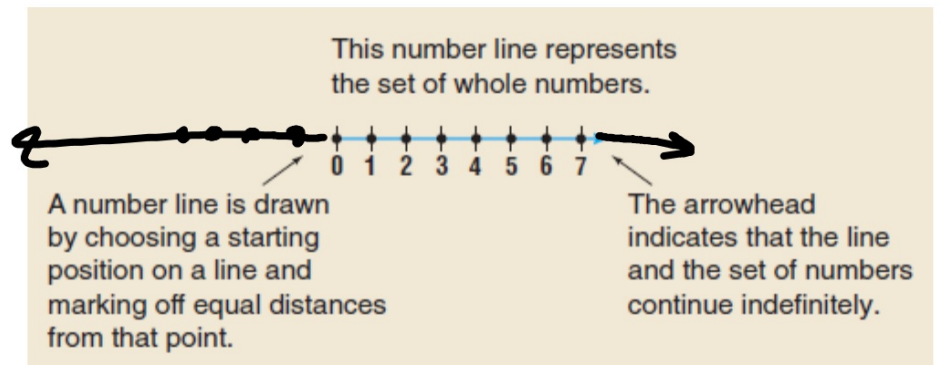integer   dots on N.L.
whole number 0 +
natural number   +
graph
coordinate
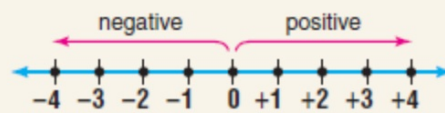absolute value
order of operations

activity: cards compare

This number line represents
the set of whole numbers.

A number line is drawn
by choosing a starting
position on a line and
marking off equal distances
from that point.

0 1 2 3 4 5 6 7

The arrowhead
indicates that the line
and the set of numbers
continue indefinitely.

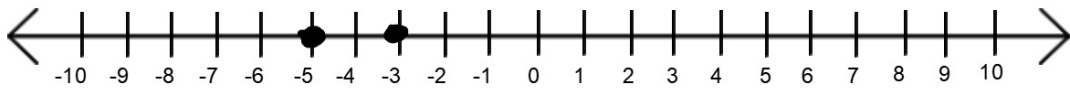| **Integers** | **Words:** | Integers are the negative numbers $-1, -2, -3,$ $-4, \ldots$ and whole numbers $0, 1, 2, 3, 4, \ldots .$ |
| | **Symbols:** | $\{\ldots, -4, -3, -2, -1, 0, 1, 2, 3, 4, \ldots\}$ |
| | **Model:** | negative   positive |

Zero is neither negative nor positive.

1 Name the coordinates of A, B, and C.

```
        A       D  C  E        B              F
  ←―――+――●――+――●――●――●――+――●――+――+――●――→
     -5  -4  -3 -2 -1  0  1  2  3  4  5
```

2 Graph points X, Y, and Z on a number line if X has coordinate 4, Y has coordinate 0, and Z has coordinate -3.

```
  ←―+―+―+―+―+―+―+―+―+―+―+―+―+―+―+―+―+―+―+―+―→
   -10 -9 -8 -7 -6 -5 -4 -3 -2 -1  0  1  2  3  4  5  6  7  8  9  10
```

The number line ranges from -10 to 10, with filled dots at -5 and -3.

3 $4 \bullet -1$

4 $-5 < -3$

$-3 \, \textcircled{>} \, -5$

Your Turn

c. $-1 \bullet -2$ d. $2 \bullet -2$ e. $0 \bullet 1$

	Words:	The absolute value of a number is the distance it is from 0 on the number line.
Absolute Value	Model:	4 units ← → ← → 4 units −5 −4 −3 −2 −1 0 1 2 3 4 5
	Numbers:	$|-4| = 4,\ |4| = 4$

$|-15| = 15$

$|20| = 20$

abs. val = how far?

$|3| = 3$

Evaluate each expression.

6 $|-3| = 3$

$|-2|$ MK

−3 0 K

$= 2$

7 $|-5| - |2| = 3$

$5 - 2$
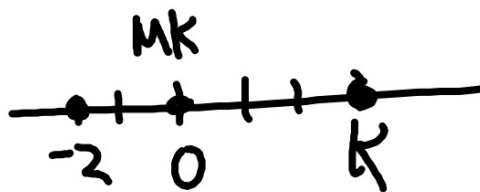
f. $|9| = 9$

g. $|-2| + |-6|$

↓ ↓

$2 + 6 = 8$

h. $|15| - |-4|$

↓ ↓

$15 + 4 = 11$

whiteboards

$$|(3 + {}^-5)| \qquad |(3 - 5)|$$

$$|-2| = 2 \qquad |(3 + {}^-5)|$$

$|-6|$

$|-1,000|$

$||7||$

$||7||$

$|3-6|$

$|-3|$

$$\left| 4 + 6 \right| = \qquad \left| 2 \cdot 3 - 12 \right|$$

$$\left| 5 + {}^-10 \right| \qquad \left| 6 - 12 \right|$$

$$\left| 10 \cdot 2 - 30 \right| \qquad \left| 3 \cdot 5 - 15 \right|$$