Understanding Absolute Value
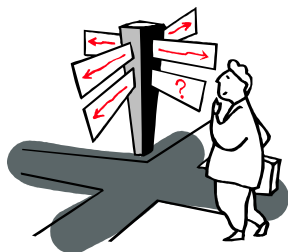
You are meeting a friend for lunch, but you can't find him. You text your friend to tell him where you are. He answers that he is 3 blocks away. But which way should you go to find him? Even though you know how far away he is, you don't know in which direction.

Absolute values can help you express distance, but they do not express **direction**. The **absolute value** of a number is its distance from zero on the number line. It is written using the symbol | |. When you see this symbol around a number it means to take the absolute value of that number. So the number $|-3|$ is read "the absolute value of negative three."

To find the absolute value of a number, think about how far it is from zero on the number line. Since -3 and 3 are both three units away from zero, $|-3| = 3$ and $|3| = 3$.

Back to your friend. In real-world situations, you need more than **distance** in most cases. Your friend could use descriptive words like "north," "towards the river," or "away from the park" to help you find him.

There are times when direction doesn't matter. For instance, when playing darts, the further your dart lands from the center, the lower the score. It doesn't matter whether you miss up, down, left or right. You score will be the same. There are no negative scores.

In mathematics, there are times when direction doesn't matter. All we need to know is "How far is this number from zero?" or "What is the **magnitude** of the number?" That's when we use absolute value.

Use what you know about **absolute value** to answer the following questions.

1) $|-7|$ = _____   2) $|9|$ = _____   3) $|-16|$ = _____

4) $|-235|$ = _____   5) $|-33|$ = _____   6) $|44|$ = _____

7) The elevation of a kite is +120 feet. Express this as an absolute value.
        |____| = _____ feet above the ground.

8) The temperature is -4°C. Express as an absolute value.
        |____| = _____ degrees below zero.

9) A diver is at a depth of -55 ft. Express as an absolute value.
        |____| = _____ feet below sea level.

10) A person has a bank account of -25 dollars. Express as an absolute value.
        |____| = _____ dollars in debt.

9) Why is it important to describe the meaning of an absolute value in real-life using words such as *above* and *below?*_____
_____

10) Is the absolute value of a number ever negative? Why or why not? _____
_____

11) How do the absolute value of a number and its opposite compare?
_____

11) If you know how far a number is from zero on a number line, do you also need to know whether it is to the right or left to write its absolute value? Explain.
_____
_____

12) What can you say *for sure* about the position of a number on the number line if you know the absolute value of the number? What can you NOT determine about the location of the number?   Explain your answer using the term **magnitude**.
_____
_____
_____
_____