MATH 5e: Class Work 8

Topics: Fractions and decimals. More word problems

- Representing data with fractions

A sector is a part of a circle enclosed between 2 radii. A central angle is the ∢ AOB with a vertex at the circle's center. The size of a sector is proportional to the measure of the angle.
Example: a central angle that is 90º is 90º/360º = ¼ of the circle.
Central angles can be used to present data in a circular diagram – a pie chart.

- Algebraic expressions with negative numbers (Review + new)

Numbers to the left of zero on the number line are called **negative**. They are less than 0, and we write the "–" in front of them. The numbers to the right from zero are positive.

- If we add a positive number to any number, we move to the right of the number light (increasing the value).
- If we add a negative number, we move to the left, decreasing the value, which is the same as subtraction: $7 + (-5) = 7 - 5$ and $7 + (-5) = -7 - 5 = -14$

The opposite numbers are two numbers that are different only by their signs. They form a pair that is the same distance from 0 on the number line. The opposite of 2 is -2 and they form a pair.
The sign "–" means opposite.

- The opposite of negative 2 is: $-(-2) = 2$, and the opposite of 2 is – (+2) = -2.

The absolute value of a number is the distance from the number on the number line to zero. The symbol for absolute value is | |.

- The absolute value of a positive number is that number; the absolute value of a negative number is the opposite number. For example, $|4| = |-4| = 4$. The absolute value of 0 is zero.

Addition/subtraction with negative numbers:

$+(-a) = -a$ *keep the sign*
$-(-a) = +a$ *change the sign*

$(-a) + (-b) = -a - b = -(a + b)$
$(-a) + (+b) = -a + b = +(b - a)$ *if* $|b| > |a|$
$= -(a - b)$, *if* $|a| > |b|$

- To add negative numbers, add the absolute values and write the negative sign in front of their sum.
- To add numbers with different signs, subtract the absolute values and write the sign of the larger number in front of their sum

- Equations with absolute values:

An equation like $|x| = 5$ has two solutions: $x = 5$ and $x = -5$.
An equation like $|x - 1| = 4$ also has two solutions: $x - 1 = 4$ (which gives x = 5) or $x - 1 = -4$, which gives $x = -4 + 1 = -3$

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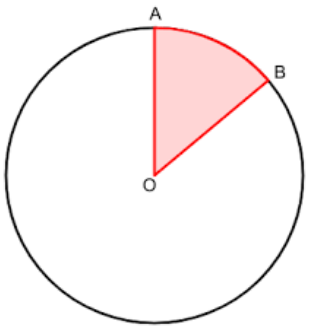
Problems

Visualizing fractions

1. Find what part of the circle is a central angle with a measure of
   a) 60^o
   b) 45^o
   c) 150^o



2. In one school, 48 students play varsity sports. Four students are wrestling, eight play basketball, sixteen play soccer, twelve compete in track and field, and eight play volleyball.
   Represent the students by sport using a pie chart.

Negative numbers, opposite numbers, absolute value

3. Write the opposite of these numbers
   $0.4\ ,\ 23, -6\ ,\ 4, 7\ ,\ -9$

4. For the following numbers $\quad 6\ ,\ 0.5\ ,\ -3, \frac{3}{2}\ ,\ -5.7\ ,\ 1.2\ ,\ 4\ ,\ -\ 7$
   a) Draw their opposite numbers on a number line
   b) Find their absolute values

5. Evaluate:
   a) $-2 + 7 =$
   b) $-10 - 11 =$
   c) $2 + (\ -6 - 7) =$
   d) $11 - 7 + (-3) =$
   e) $6 - (-6\ + 2)\ =$
   f) $\big(-6 +\ (-7)\big) +\ (-12) =$

6. We have a set of the following numbers: $\ x\ \in \{-4, -3, -2, -1, 0, 1, 2, 3, 4, 5, 6\}$

   a) List the numbers for which $|x| < 3$
   b) List the numbers for which $|x| > 2$

7. What are the values of x in the following equations

   a) $|x| =\ 5$
   b) $|\ x| = 6.9$
   c) $|\ x| =\ -3$
   d) How many solutions do absolute value equations have?

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8. Solve the equations:

   a) $|x - 1| = 4$
   b) $|x + 5| = 7$
   c) $|-3| + y = 23$

If time:

9. Solve the following equations

   a) $\frac{x}{3} + 4 = \frac{3x}{5}$
   b) $x - 1 = 6(x - 3)$
   c) $2x + \frac{1}{5}x = 6$