Math 3 Classwork 9

Warm-Up

1

$3 \times 2 =$ $\quad$ $2 \times 4 =$ $\quad$ $5 \times 2 =$ $\quad$ $4 \times 3 =$ $\quad$ $3 \times 5 =$

$4 \times 2 =$ $\quad$ $2 \times 6 =$ $\quad$ $5 \times 4 =$ $\quad$ $4 \times 2 =$ $\quad$ $5 \times 5 =$

2

a) Arrange these numbers in increasing order, beginning with the least.
2400 4002 2040 420 2004 ________________________________

b) Arrange these numbers in decreasing order, beginning with the greatest.
1470 847 710 1047 147 _________________________________

3

Both letters A stand for the same digit. Find the value of A.

$$\begin{array}{r} 2A06 \\ -\ 134A \\ \hline 1458 \end{array}$$

Homework Review

1. Alex has ***a*** books, Boris has ***b*** books, and Victor has ***c*** books. Explain the meanings of the following expressions:

a + b how many books Alex and Boris had together.

a + c ____________________________________

a – c _____________________________________

b + c ____

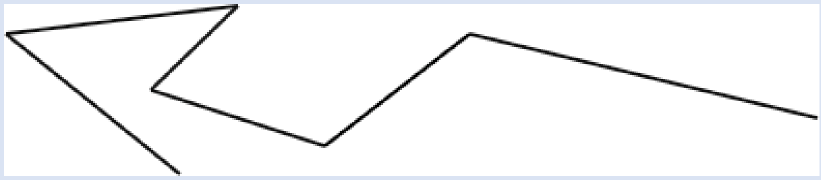
a + b + c ______________________________________

b – c ____

2. Draw two closed curves, one inside the other. Draw an open curve that intersects each of the closed curves at two points. Label the intersection points with any letters you choose.

Lesson 9 **Types of polygons. Perimeter. Measuring Tools.**

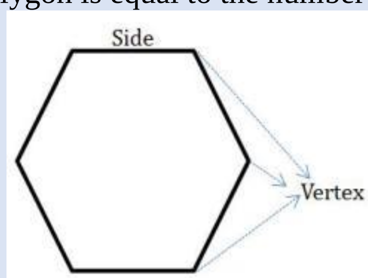
In geometry, a **polygonal chain** is a is a collection of line segments, connected end to end and not self-intersecting. Polygonal chain can be “open” or “closed”.



If three or more line segments connected end to end is called a **Polygon.**

- The line segments forming the polygon are called sides.
- The point of junction of two line segments is called a vertex.

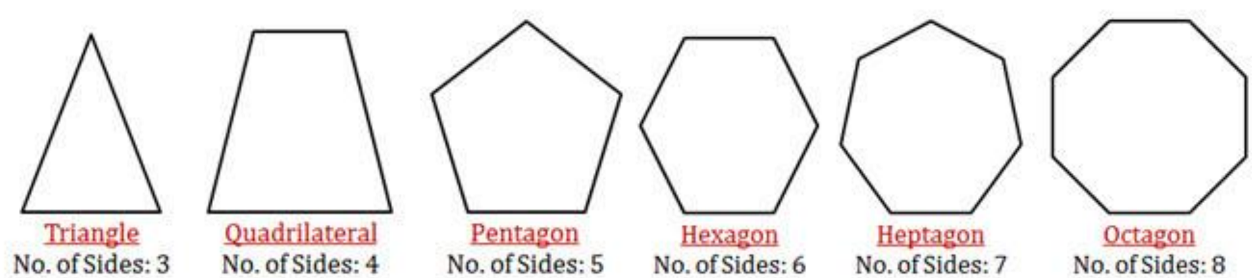
Number of vertices of a polygon is equal to the number of line segments or sides.

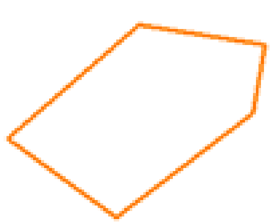


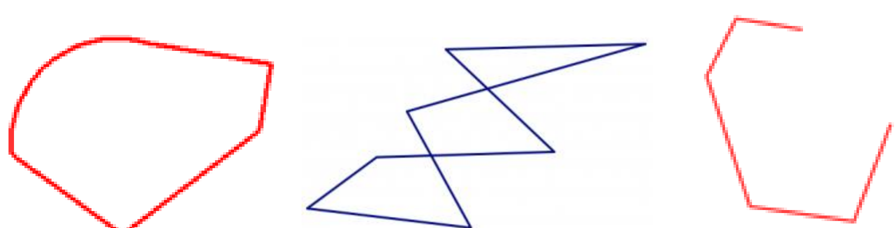
A polygon is any **shape** made up of straight lines that can be drawn on a flat surface, like a piece of paper.

POLYGON comes from Greek: POLY – means “many” and GON means “angle”

Different types of polygons:



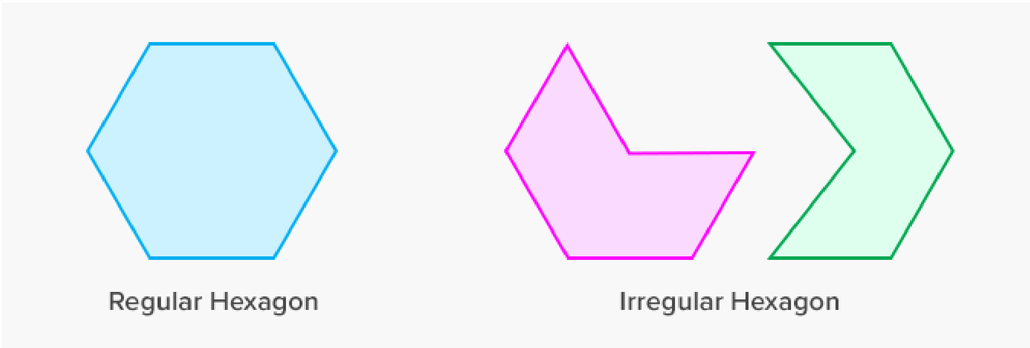




Polygon NOT Polygons - WHY?

Types of Polygons

When the length of all the sides and measure of all the angles are equal, it is a **regular polygon**, otherwise it is an **irregular polygon**.



Triangle: 3 points (vertices) connected by 3 line segments

Quadrilateral: 4 vertices, connected by 4 segments

Pentagon (5 vertices),

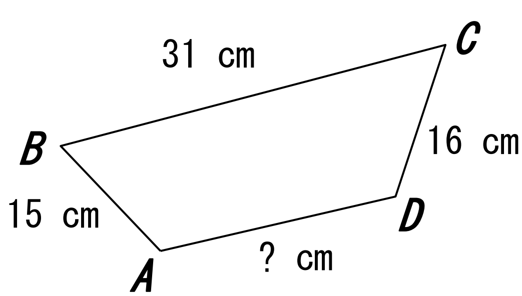
Hexagon (6 vertices), and so on.

All of them are special cases of a polygon – a figure consisting of some number of points (vertices), connected with line segments to form a closed figure.

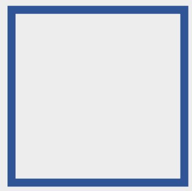
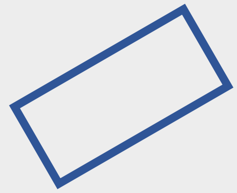
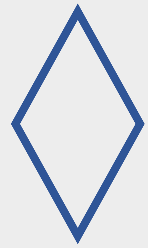
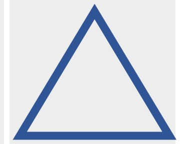
These line segments are called the sides of the polygon.

A Perimeter of a polygon is the sum of lengths of its sides.

4 The perimeter of the quadrilateral ***ABCD*** equals 84 cm. What is the length of side ***AD***?



5 Look at each figure. Place an X in the box with a description of the figure pictured.

				
4 vertices				
Four sides				
Opposite sides parallel				
Perpendicular sides				
Opposite sides have equal length				
All sides have equal length				
Contains right angle(s)				
Contains acute angle(s)				
Contains obtuse angle(s)				

New Material

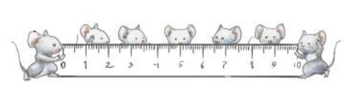
Geometry Tools:

Points, lines, and angles can be constructed only with the use of **the straightedge and the compass.**

To draw geometric figures, we use four important tools of geometry — **compass, straightedge, protractor, and ruler.**

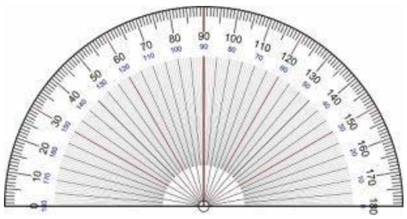
Straightedge. A straightedge is simply a guide for the pencil when drawing straight lines

Ruler. A ruler is a geometric tool used to measure the length of a line segment. A ruler is basically a straightedge with marks usually used for measuring either inches or centimeters. To use a ruler, place the zero mark on the point to begin the measurement. To stop measuring, look at the mark on the ruler that lies over the point at which the measurement is to end.



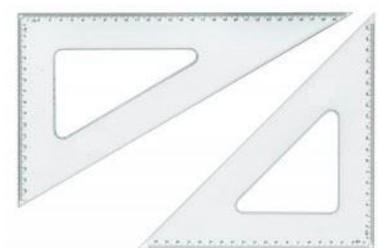
Lesson 9 **Types of polygons. Perimeter. Measuring Tools.**

Compass. Compasses are a drawing instrument used for drawing circles and arcs. It has two legs, one with a point and the other with a pencil or lead. You can adjust the distance between the point and the pencil, and that setting will remain until you change it.



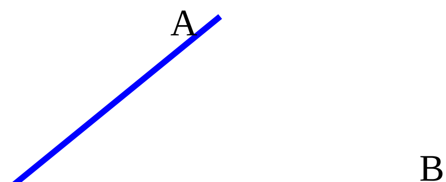
Protractor. A protractor is a geometric tool in the shape of a semicircular disk, as shown on the picture. It is used to measure the size of an angle in degrees—from 0° to 180° degrees. There is 360° in one full rotation (one complete circle around)

A Full Circle is 360 °
Half a circle is 180° – called a Straight angle
Quarter of a circle is 90° – called a Right angle
180 ° > obtuse angle is > 90°
90° > Acute angle > 0°



The Set-Squares. These are the triangular pieces of plastic with some portion between them removed. There are two kinds of set squares available in the market. One has the angles 45°, 45° and 90° degrees at the 3 vertices while the other has 30°, 60° and 90°-degree angles. They are used to draw parallel and perpendicular lines.

6. a) Using a protractor, measure the angle ∠AOB in degrees. ∠AOB = __
b) From the vertex of angle AOB draw a ray OK so that it forms obtuse angles with both sides – OA and OB. Use a protractor to measure those angles and write down the results.
∠KOA = _________________
∠KOB = _________________



REVIEW

7 Compare using <, >, =

a + b ___b + a	a + a + a + a ____ 3 × a + a	a + 17 ___ 17 + a
4b – b – b ___3 × b	a + 1 – n ____ a + 1 + n	4 × 4 ____ 8 × 2
7 × 3 ____6 × 4	7 × a _____ 7a	71 – 25 ___ 72 – 26

Did you Know …?

A full circle is 360 degrees, but why?

You must be wondering what reasons there might be for using 360° to represent a full circle.

1. Mathematical reasons (Theory # 1):

The number 360 is divisible by every number from 1 to 10, aside from 7. It actually divides into 24 different numbers: 1,2,3,4,5,6,8,9,10,12,15,18,20,24,30,36,40,45,60,72,90,120,180 and 360 itself. These 24 numbers are called the divisors of the number 360. This is the highest number of divisors for any positive whole number up to its own value of 360.

This characteristic of the number 360 makes it a **highly composite number**. Numbers are said to be highly composite if they have more divisors than any smaller number has. The only highly composite numbers below 360 are 2, 6, 12, 60 and 120. Highly composite numbers are considered good base numbers with which to perform common calculations. For example, 360 can be divided into two, three and four parts and the resulting number is a whole number. The resulting numbers are 180, 120 and 90.

2. The length of a year (Theory #2):

Have you all ever wondered why there are exactly 365 days in a year? Again, why wouldn't they use a more convenient number like 300 or 400? Ancient astronomers, mainly the Persians and the Cappadocians, noticed that the sun took 365 days to come back to the exact same position. For simplicity, they decided to round that down to 360 days per year.

In other words, the sun advances by one degree each day along its elliptical path. The Persians had a leap month every 6 years to adjust for the 5 extra days. Also, the lunar calendar has a total of 355 days, while the solar calendar has 365. And what number sits perfectly between the two and is a highly composite number? Yes… 360!

3. Historical reasons (Theory #3):

Another theory that suggests why a full circle is considered to be 360 degrees comes from the Babylonians. The Sumerians and Babylonians were known to use the **Sexagesimal** numeral system. The sexagesimal system is one with a base value of 60, whereas the current system we use is known as the decimal system and has a base value of 10. So, once we reach the 10th number, we start repeating the symbols (of previous numbers, from 0 to 9) to form new numbers.

The Babylonians had 60 different symbols with which they formed numbers. Again, why would they use 60? Because 60, just like 360, is a highly composite number with up to 12 factors. Just as we can count 10 on our fingers for the decimal system, we can also count to 60. Start by counting the knuckles of the 4 fingers (not the thumb) on your right hand. 12, right? Now, on the other hand, raise any of those fingers to remember that you finished one iteration and got the number 12. Now, repeat the same procedure as many times as the number of fingers remaining on the left hand. The number you will end up with is 12 knuckles x 5 fingers = 60.