Math 3, Classwork 8

WARM-UP

1. What digit the result of the expression ends with (do not calculate)?

$11 \times 15 + 12 \times 15$ _____

2. Ved wrote that $9 + 9 = 18$. Then he wrote that $9 + 9 + n = 18 - n$.
Are his equations balanced?

_____

_____

3. Write down the expressions:

a) There are n pencils in 4 boxes. How many pencils are there?

_____

b) There are m pine trees in the backyard, and twice as many maple trees.

How many pine and maple trees are there in the backyard?

_____

c) Alex bought a slices of pizza for 4 dollars each and b bottles of water for 2 dollars each. How much money did he totally spend?

_____

d) There are 9 chocolate candies and 11 caramels in one box. How many candies are there in c boxes?

_____

e) There is a basket containing 5 apples, how do you divide the apples among 5 children so that each child has 1 apple while 1 apple remains in the basket?

_____

REVIEW I

Measuring distance, unit

1 kilometer = 1,000 meters

1 meter = 10 decimeters

1 decimeter = 10 centimeters

1 centimeter = 10 millimeters

4. a) Convert to centimeters:

4dm 5cm = _____ 2dm 7 cm = _____

1m 3dm 2cm = _____ 6m 6dm = _____

25dm = _____ 50dm 5cm = _____

b) Compare using <, > = :

3dm ____ 30cm 2dm _____ 17cm

1dm 4cm ____ 11cm 5m _____ 50dm

25dm _____ 2m 32cm _____ 3dm

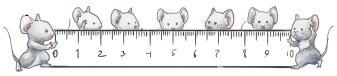
NEW MATERIAL

Geometry Tools:

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

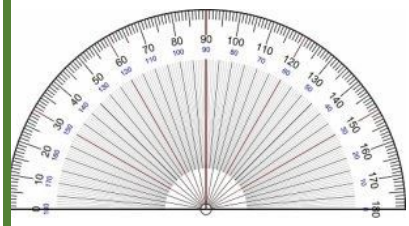
To determine geometric designs, four important tools of geometry—compass, straightedge, protractor, and ruler – are used.

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.

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.

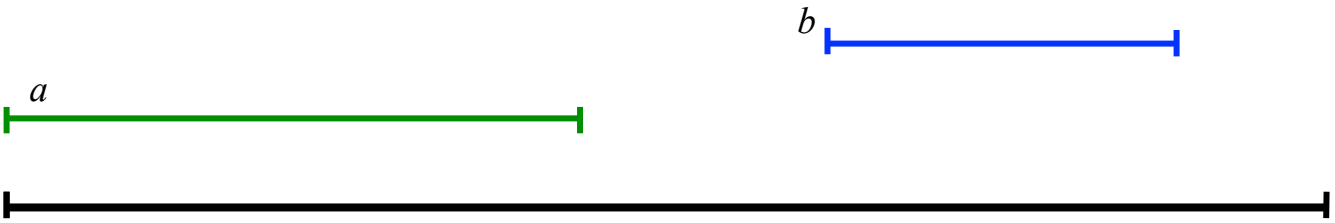


Protractor. A protractor is a geometric tool in the shape of a semicircular disk, as shown above on the right. It is used to measure the size of an angle in degrees—usually from 0 to 180 degrees.

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.

5. Using a compass and a straightedge (ruler) construct a line segment which is

a) The sum of the segments *a* and *b*.



b) The difference of those segments.

6. Use a ruler and a protractor to draw lines and measure each of the angles below to the nearest degree. Write the angle measurements (in degrees) in the blank spaces provided.

a) Angles that are less than 90 degrees (<90°) are called: _____

• D • F

• A

• C • E

• B

∠**ABC** = _____ ∠**DEF** = _____

b) Angles that are greater than 90 degrees (>90°) are called: _____

• P

• M

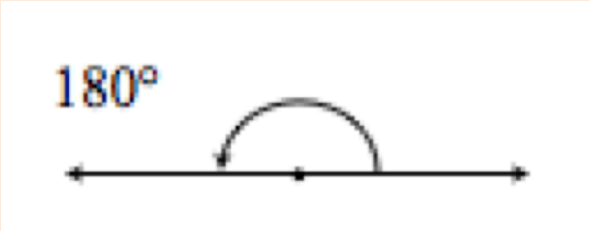
• Q

• N

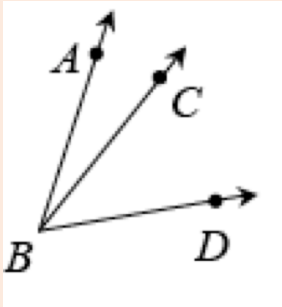
• R • O

∠**PQR** = _____ ∠**MNO** = _____

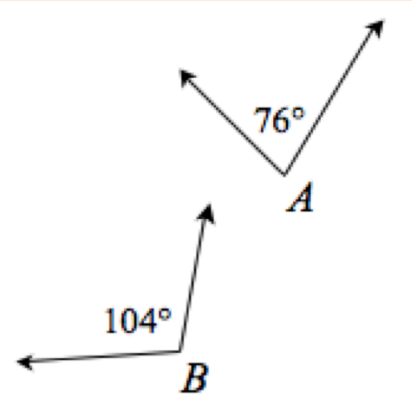
A **straight angle** is an angle that forms a straight line. It measures 180 degrees.

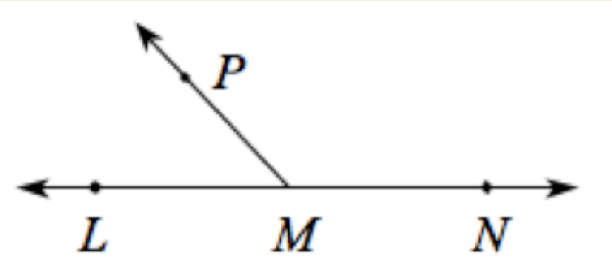


Adjacent angles: Two **angles** are **Adjacent** when they have a common side and a common vertex (corner point) and don't overlap. In the example at right, ∠ABC and ∠CBD are adjacent angles.



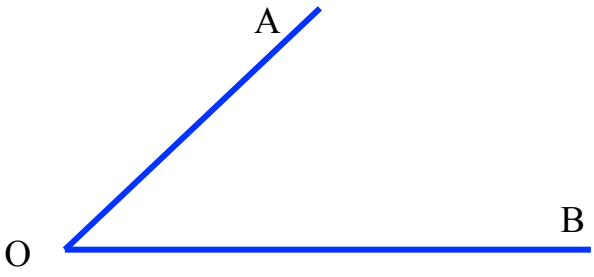
Supplementary angles: Two angles A and B for which A + B = 180°. Each angle is called the supplement of the other. In the example at left, angles A and B are **supplementary**. Supplementary angles are often adjacent. For example, since ∠LMN is a straight angle, then ∠LMP and ∠PMN are supplementary angles because ∠LMP + ∠PMN = 180°.





7. 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 = _____



8. a) Make a list of the first ten multiples of 3.

_____

b) Which of the numbers in your list are multiples of 6? What pattern do you see in where the multiples of 6 appear in the list?

_____

c) Which numbers in the list are multiples of 7? Can you predict when multiples of 7 will appear in the list of multiples of 3? Explain your reasoning.

_____

_____

_____

9.

Cora and Cecilia each use chalk to make their own number patterns on the sidewalk. Cora puts 0 in her first box and decides that she will add 3 every time to get the next number. Cecilia puts 0 in her first box and decides that she will add 9 every time to get the next number.

Cora:

0	3								

Cecilia:

0	9								

a) Complete each girl's sidewalk pattern.

b) How many times greater is Cecilia's number in the 5th box be than Cora's number in the 5th box? _____

What about the numbers in the 8th box? _____

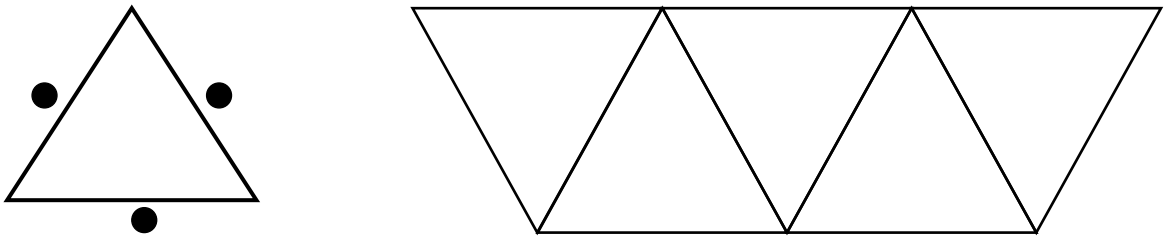
The 10th box? _____

c) What pattern do you notice in your answers for part b? Why do you think that pattern exists? _____

d) If Cora and Cecilia kept their sidewalk patterns going, what number will be in Cora's box when Cecilia's corresponding box shows 108? _____

Challenge yourself

10. A classroom has triangular tables. There is enough space at each side of a table to seat one child. The tables in the class are arranged in a row (as shown in the picture below).



- How many children can sit around 1 table? _____
- Around a row of two tables? _____
- Around a row of three tables? _____
- Find an algebraic expression that describes the number of children that can sit around a row of *n* tables. Explain in words how you found your expression.

_____

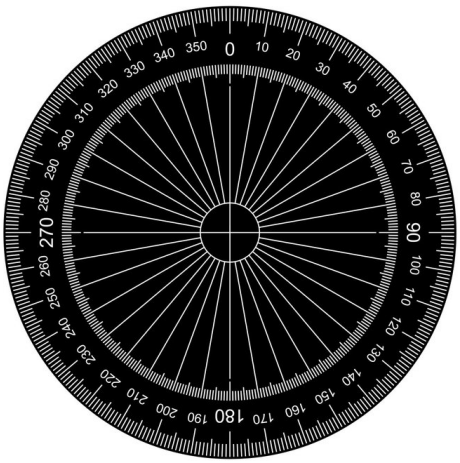
If you could make a row of 25 tables, how many children would be able to sit around it?

_____

Did you know …

A full circle is 360 degrees, but why?

You must be wondering what mathematical reasons there might be for using 360 degrees to represent a complete 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 are positive integers with more divisors than any smaller positive integer 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.