

Chapter 7

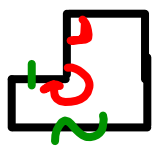
Date: Nov. 16



All sides are equal length

All angles equal

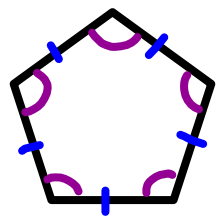
1) Determine if the following is a regular polygon (what name?)



- Sides not same length
- Angles not equal

Not A Regular Polygon

6 sides
Irregular hexagon

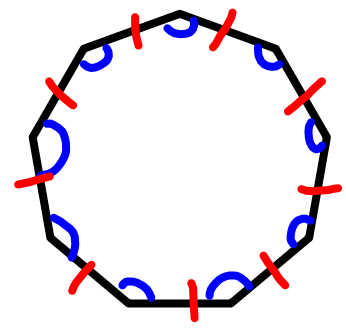


- Sides same length
- All obtuse angles

Yes, Regular Polygon

- 5 sides

Regular Pentagon



- Sides same length
- All angles equal

Yes, Regular Polygon

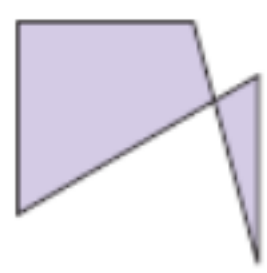
9 sides

Regular nonagon

Practice

1. Explain why each shape is not a polygon.

a)



b)

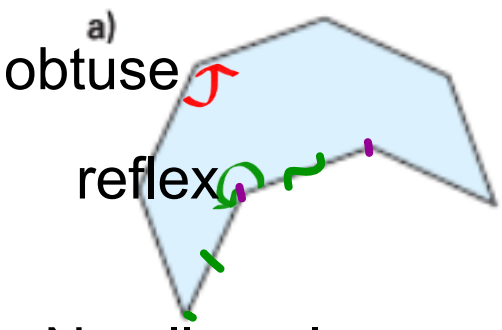


1a) Not a polygon because more than 2 sides meet at a vertex.

1b) Not a polygon because the shape is not closed.

2. Is each polygon regular? How do you know?

a)



No all angles are not equal

b)

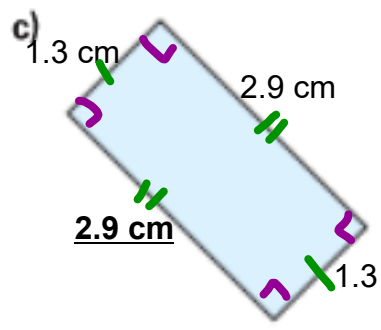


Yes all sides and angles are equal

angles = 108°

sides = 2 cm

c)



No sides are not equal

angles = 90°

3. A cell in a honeycomb approximates a regular hexagon.
   a) Suppose ∠A = 120°. What are the measures of angles B, C, D, E, and F?
   b) Suppose side AB has length 9 cm. What are the lengths of sides BC, CD, DE, EF, and FA?

all angles are equal

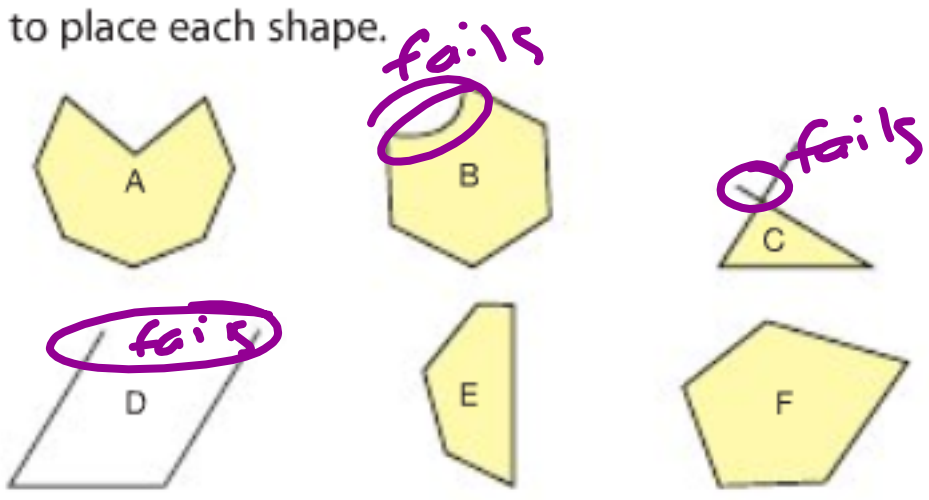


1a) In a regular hexagon all angles are equal so if ∠A is 120° then all other angles are 120°

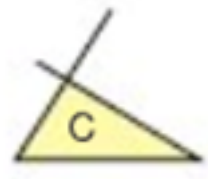
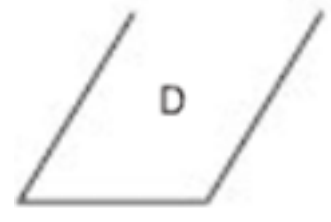
1b) In a regular hexagon all sides are equal so if AB is 9cm then all other sides are 9cm.

4. Your teacher will give you a large copy of these shapes.

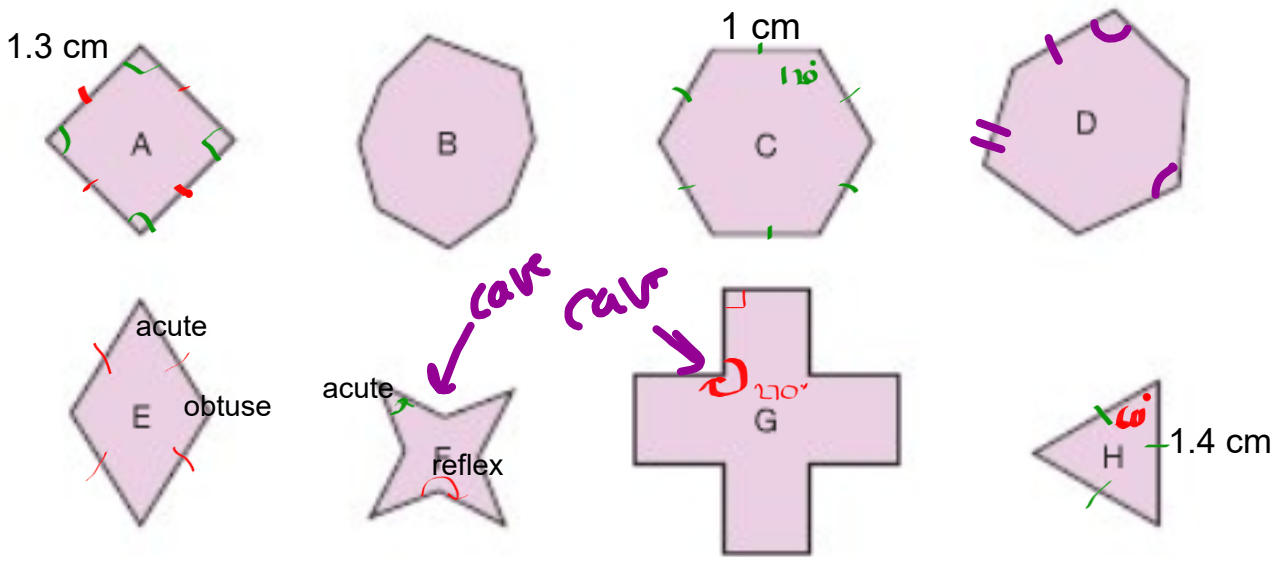
a) Sort these shapes into sets of polygons and non-polygons. Explain how you decided where to place each shape.



b) Draw a different shape that belongs in each set. Explain how you know that it belongs.

Polygons	Non Polygo
 closed shapes with sides that are straight lines Only 2 Sides meet at a vertex	 1 side is not a straight line  Sides go beyond vertex, not closed  Not closed

5. Your teacher will give you a large copy of these polygons.



a) Which polygons appear to be regular? A, C, H

b) How can you check that the polygons you identified in part a are regular? Use your strategy to check.

→ measure sides w/ Ruler
→ measure angles w/ Protractors

c) Sort the polygons into sets of regular and irregular polygons.

d) For each set in part c, draw a different polygon that belongs in that set.

e) Sort the polygons into sets of convex and concave polygons.

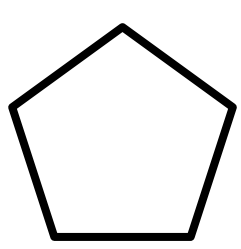
f) For each set in part e, draw a different polygon that belongs in that set.

b) I measured the sides and angles of each polygon. Polygons A, C, H are regular because they have all sides equal and all angles equal. (E, F, G have all sides equal but not all angles equal)

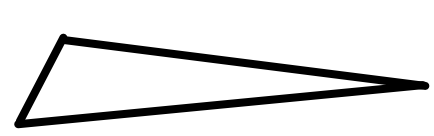
c) Regular polygons: A, C, H

Irregular polygons: Bd, D, E, F, G

d) Regular Polygon



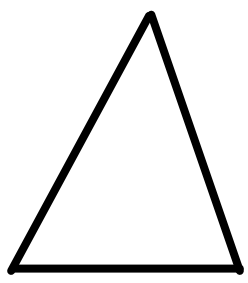
Irregular Polygon

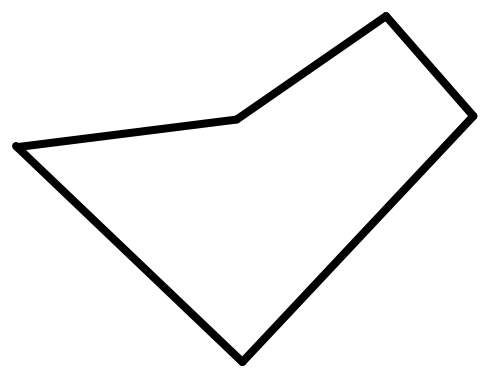


e) Convex polygons: A, B, C, D, E, H

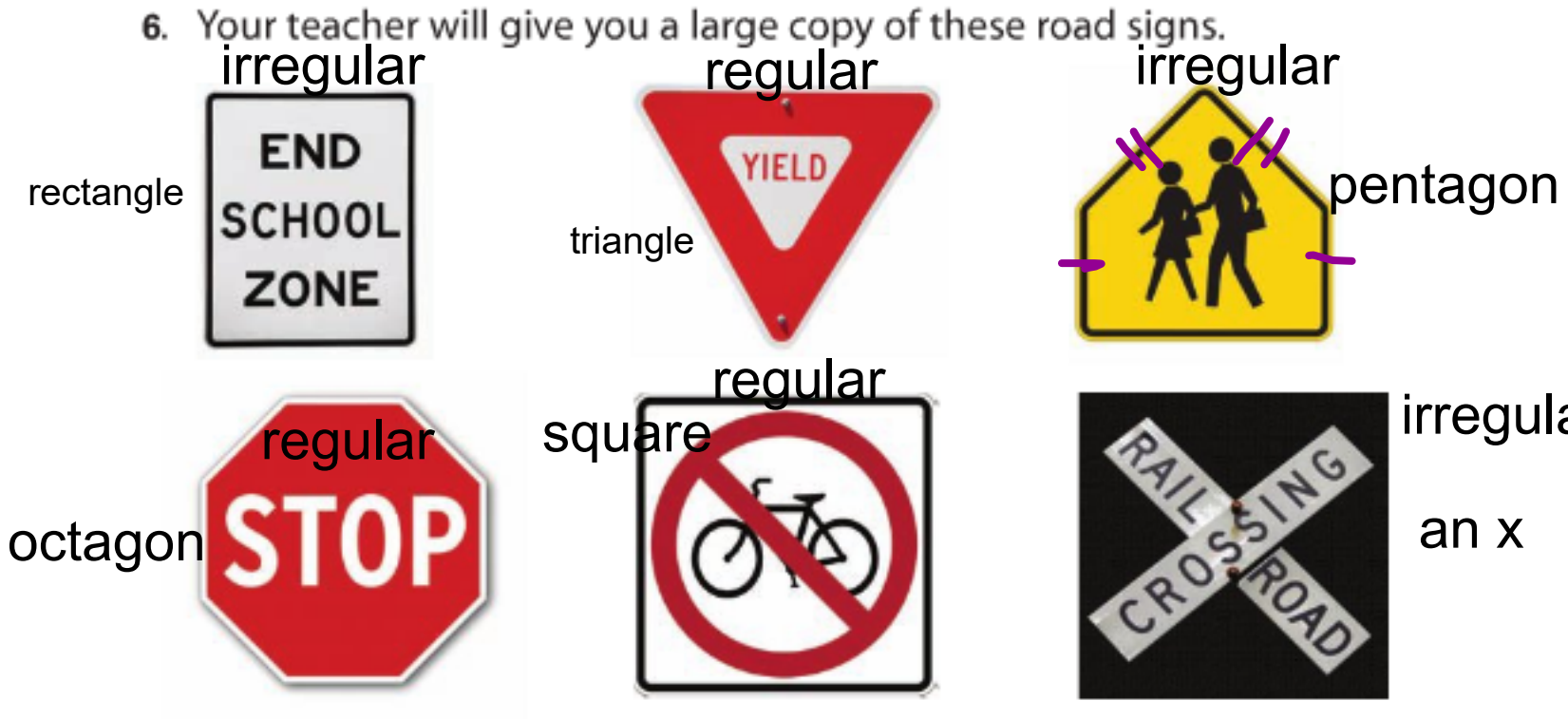
Concave polygons: F, G

f)





6. Your teacher will give you a large copy of these road signs.



Outside Regular Square

a) Name the polygon that each sign reminds you of.

b) Sort the signs into sets of regular and irregular polygons. Explain how you did this.

window is a irregular rectangle
fenced field is a irregular rectangle

TIP

7. a) Find at least 3 different irregular polygons outside the classroom.
   Describe each polygon you find.
   b) Find at least 3 different regular polygons outside the classroom.
   Describe each polygon you find.
   Name each polygon.

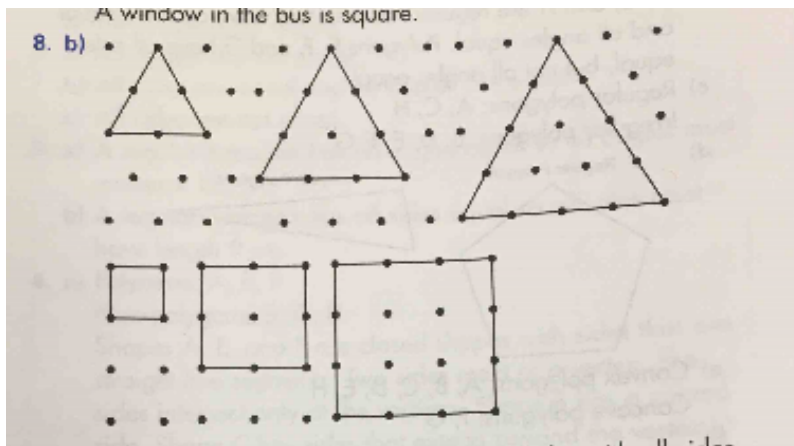
Tip of an arrow on a weather vane is a irregular triangle

8. a) What do we call:
   - a regular triangle? equilateral
   - a regular quadrilateral? square

   b) Use dot paper.
   Draw 3 different regular triangles.
   Draw 3 different regular quadrilaterals.
   c) What do you notice about the regular triangles you drew?
   What do you notice about the regular quadrilaterals you drew?

A window in the bus is square.

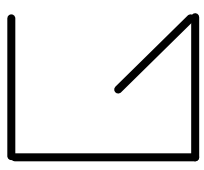
8. b)



c) The regular triangles are equilateral triangles with all sides equal and all angles 60°. They are of different sizes.
The regular quadrilaterals are all squares of different side lengths. All the angles in each square are right angles.

9. Can a concave quadrilateral be regular?
   Explain.

9. A concave quadrilateral cannot be regular because a regular quadrilateral has four 90° angles. A concave quadrilateral would have at least 1 angle greater than 180°.



Congruent Polygons

Polygons are congruent when they match exactly. Must have the following:

Must Have

Same number of sides,

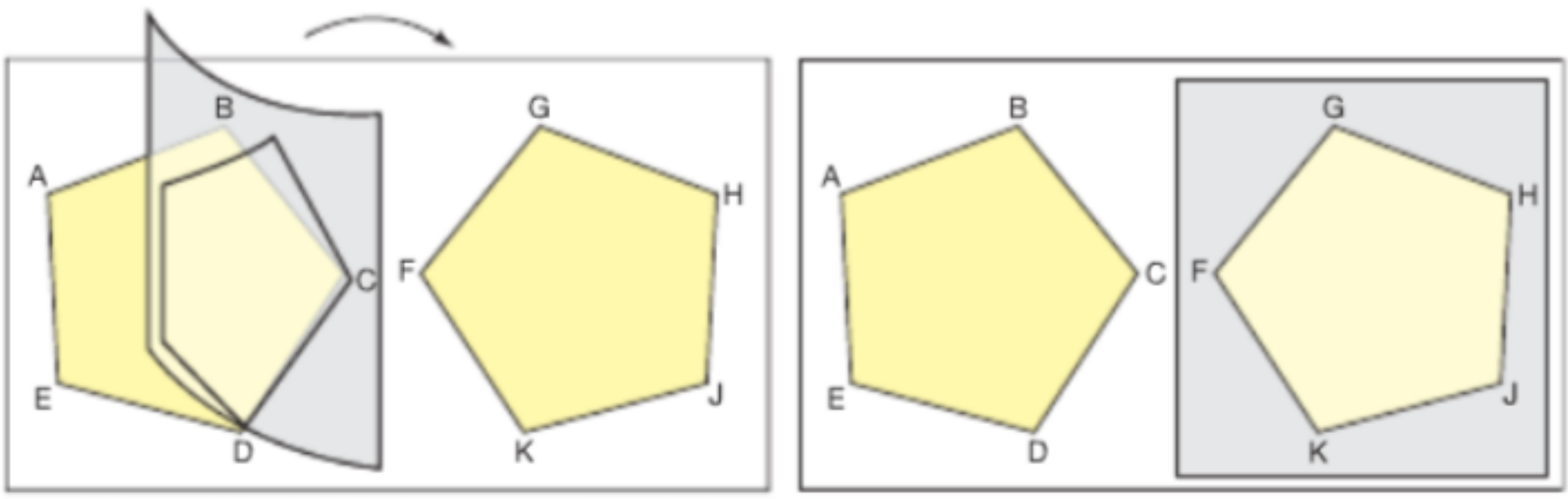
Have equal interior angles

Equal side lengths

The polygons will have the same shape and size, but one may be a rotated, or reflected (mirror image or flipped) or translated (slide).

For grade 7

To determine if shapes are congruent, we will trace the original shape on tracing paper and then slide or rotate or flip the image to see if it sits on-top of the new image.

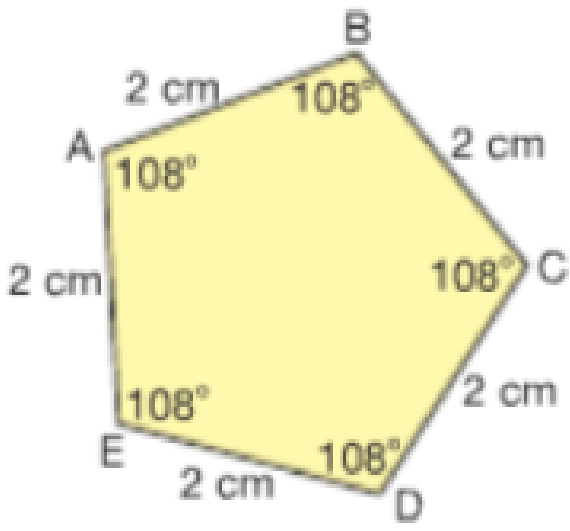


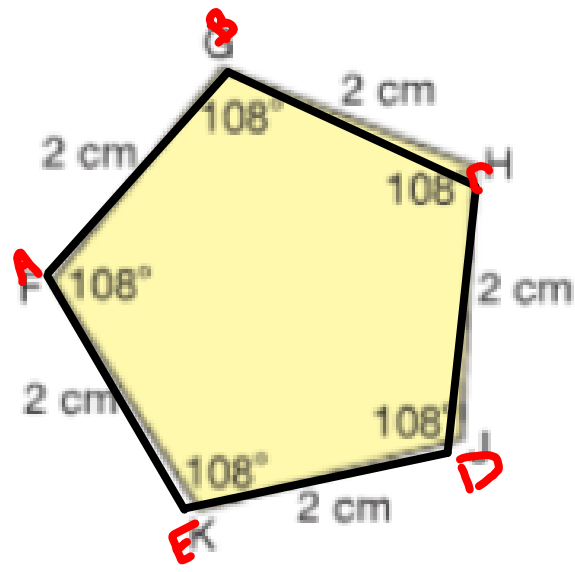
(Parchment paper works well)

For grade 7

To determine if shapes are congruent, we measure and record the lengths of all sides. Measure and record all the angle measures.

→All sides equal
→All angle equal





Fits on top
But
Rotate a little
(counter
B → G)

Congruent Shapes

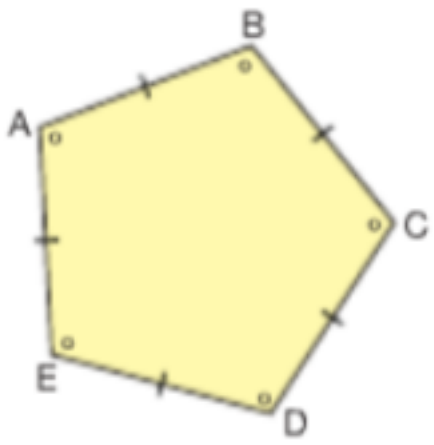
All sides have the same length.

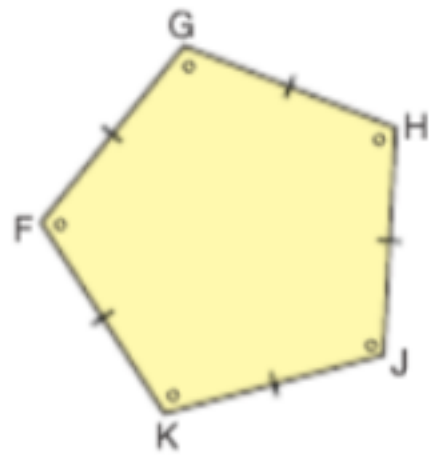
$AB = BC = CD = DE = EA = FG = GH = HJ = JK = KF$

All angles have the same measure.

$\angle A = \angle B = \angle C = \angle D = \angle E = \angle F = \angle G = \angle H = \angle J = \angle K$

We use the word *congruent* to describe equal sides and equal angles.





Use hatch marks and symbols to show the equal sides and equal angles.

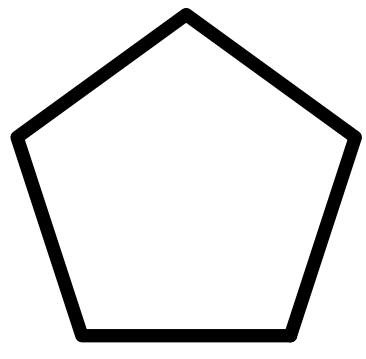
In pentagons ABCDE and FGHJK, all sides are equal and all angles are equal.
So, the pentagons are congruent.

TIP

We say: "Pentagon ABCDE is congruent to pentagon FGHJK."
We write: ABCDE ≅ FGHJK

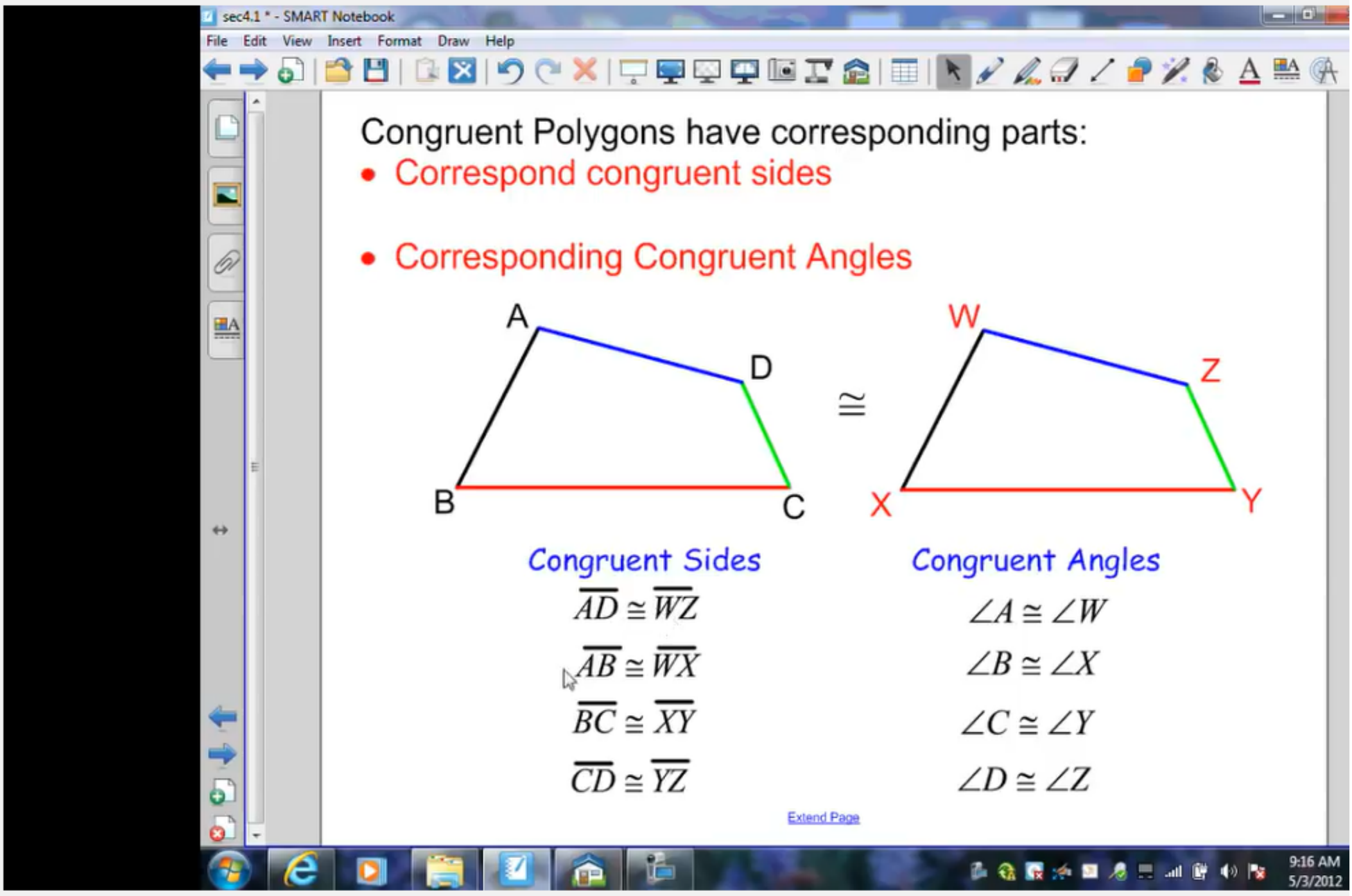
The symbol ≅ means "is congruent to."

Since all sides and angles are equal, we start with any vertex, then write the vertices in a clockwise or counterclockwise order.



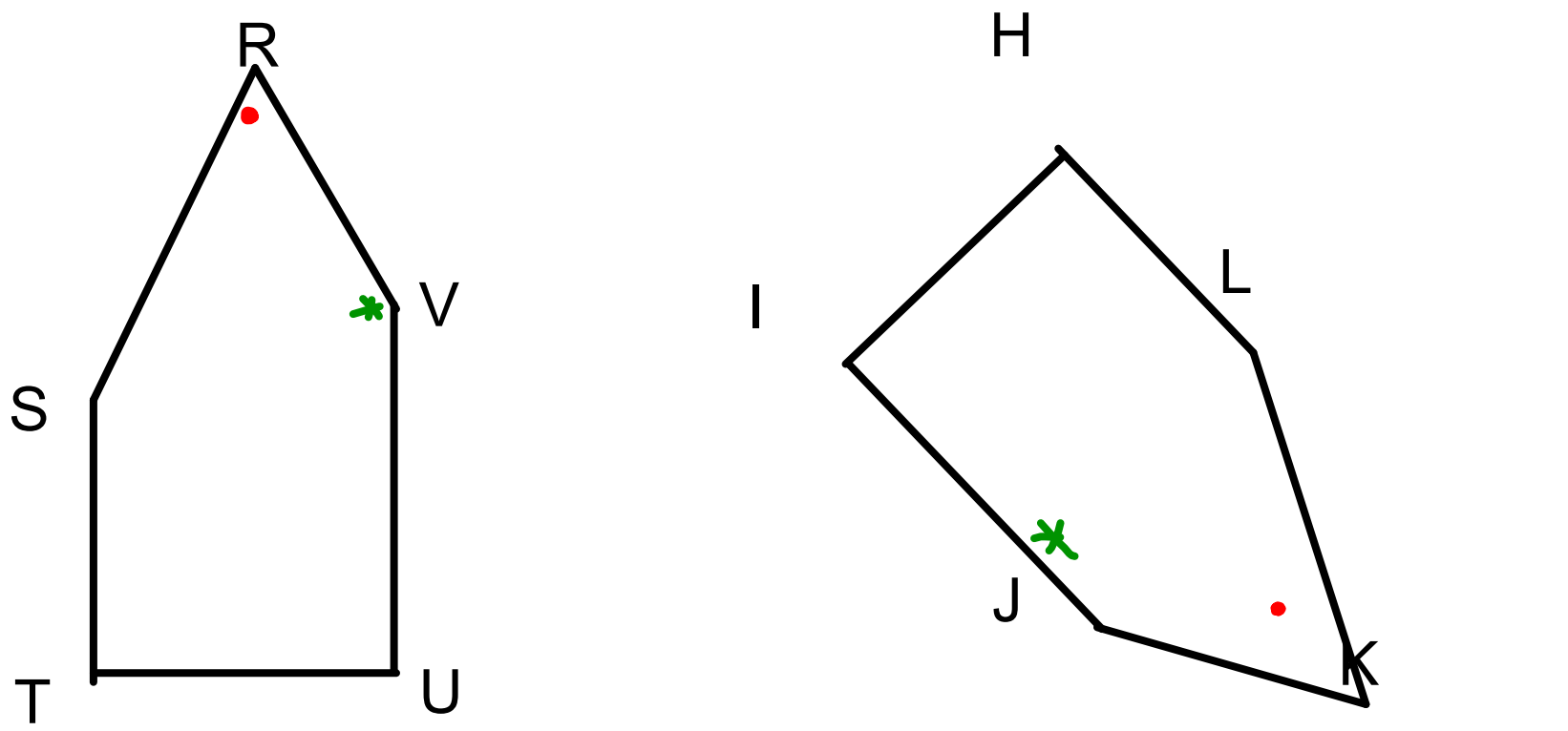
https://www.youtube.com/watch?v=Qv4OdTM1RHM

Watch first 6 min



sec4.1 Geometry Congruent Polygons.wmv

a)Use tracing paper to determine if these two polygons are congruent.



RVUTS ≅ KJIHL

b) Which angles are congruent?

Class/Homework

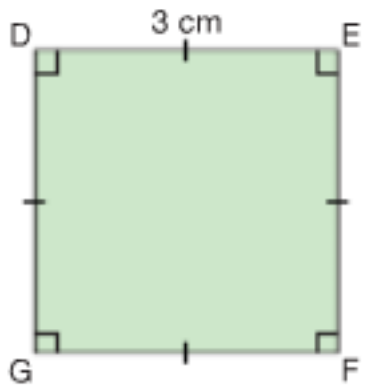
old gr 6 textbook

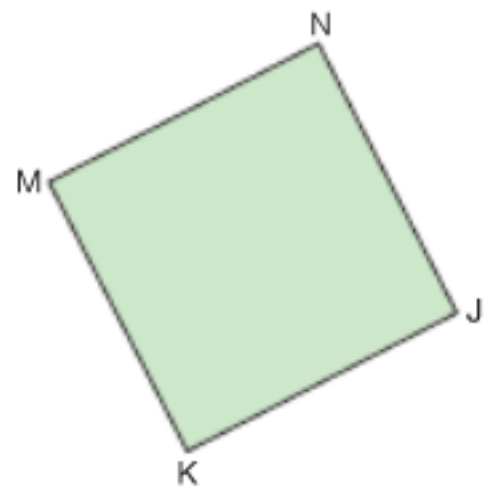
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(Already printed in booklet)

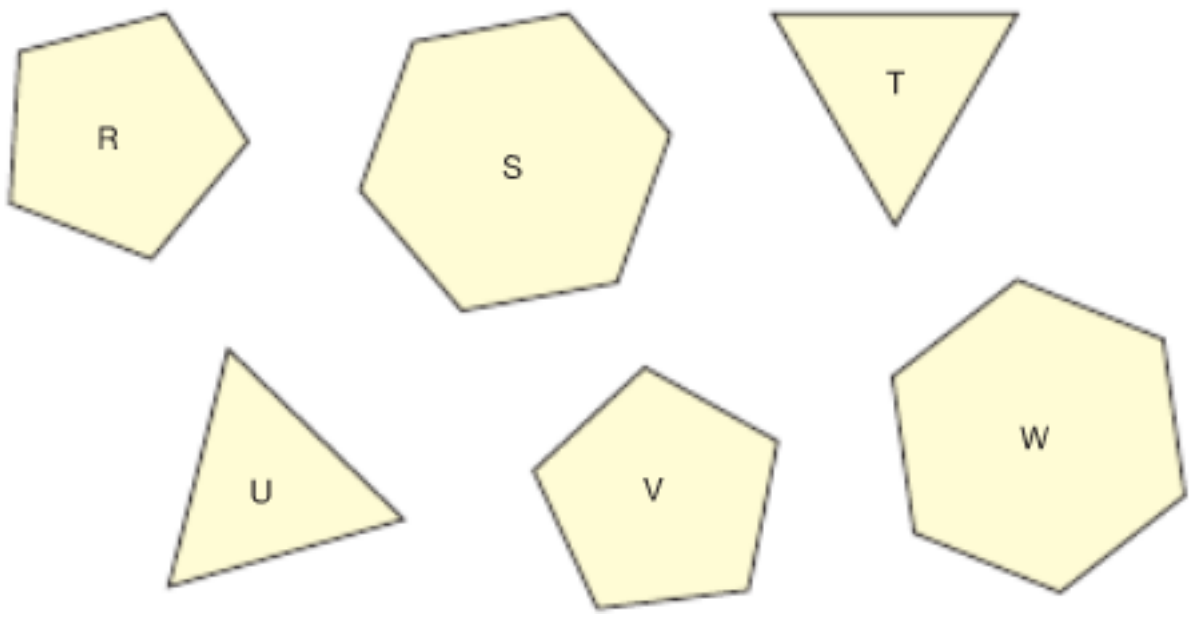
Practice

1. Quadrilaterals DEFG and JKMN are congruent.
   a) Without using a protractor, write the measure of each angle in JKMN.
   b) Without using a ruler, write the length of each side in JKMN.

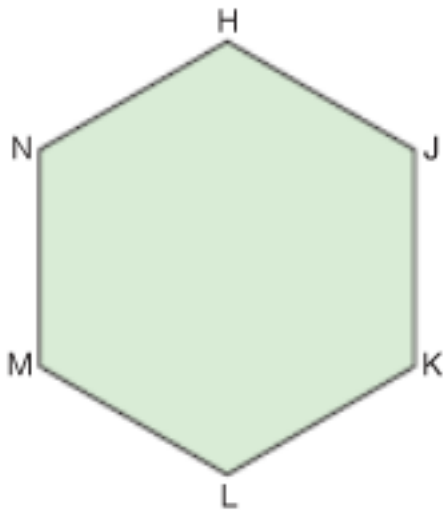




2. Which of these polygons are congruent?
   How can you tell?

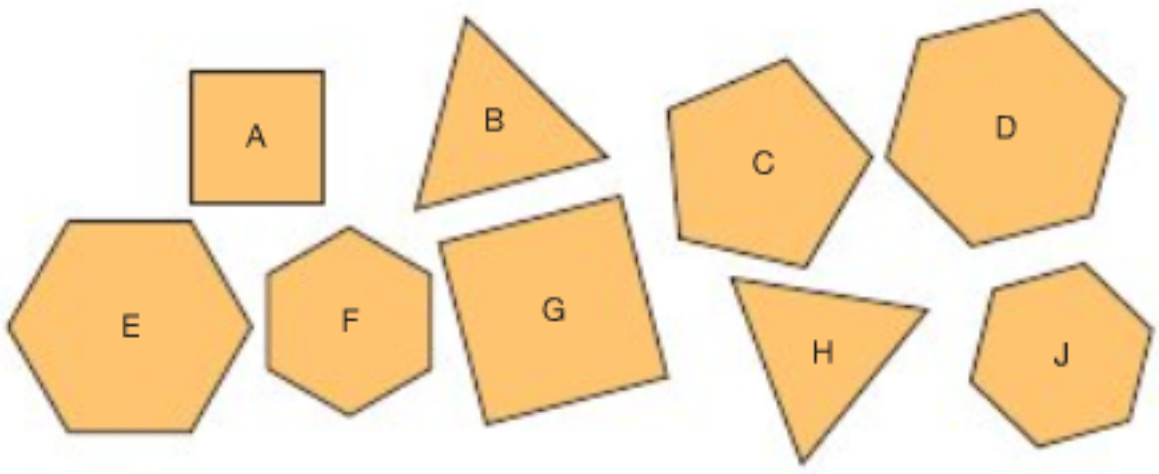


3. **a)** Use tracing paper. Trace hexagon HJKLMN on paper.
Label the vertices of the traced hexagon UVWXYZ.



b) Find the side lengths and angle measures of both hexagons.
What do you notice?

4. Your teacher will give you a large copy of these polygons.
Use whatever materials you need.



a) Which pairs of polygons have corresponding angles congruent?
Which strategy did you use to find out?

b) Which pairs of polygons have corresponding sides congruent?
Which strategy did you use to find out?

c) Which pairs of polygons in parts a and b are congruent?
How did you decide?

Show your work.

5. Work with a partner. You will need tracing paper and a ruler.
Each of you draws a triangle. Use tracing paper to draw
2 exact copies of the triangle in different orientations.
Trade triangles with your partner.
Check that your partner's triangles are congruent.
Which strategy did you use to check?



6. Draw a regular hexagon on triangular dot paper.
Use measuring and superimposing to show that all
angles are congruent and all sides are congruent.
Show your work.

7. A student drew a rectangle on grid paper.
The student said, "Since all the angles measure 90°, the angles are
congruent. So, the rectangle is a regular quadrilateral."
Do you agree? Why or why not?