

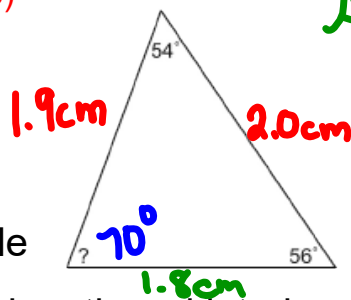


Chapter 6
Geometry & Measurement

Lesson 4

Not drawn to scale

We name angles by side length (equilateral, isosceles and scalene) and interior angles (acute, right and obtuse)



Angle sum of Δ
to find missing angle

Given = $54^\circ + 56^\circ$
= 110°

1. Find the missing angle

2. Name the triangle by length and interior angle

Missing angles

\rightarrow All side lengths are different then it is scalene.

$180^\circ - \text{Given}$

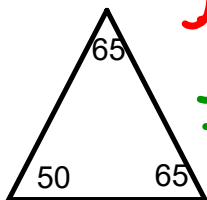
\rightarrow Acute Δ b/c all angles are less than 90° .

$180^\circ - 110^\circ$

70°

Part 2- Name the triangles base on the interior angles

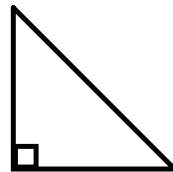
a



Acute Δ

Isosceles Δ
 \hookrightarrow 2 equal angles

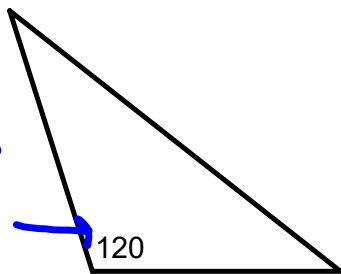
b



Right Δ

c

Obtuse Δ



d

Obtuse Δ



Practice

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#2,3,4,5,6

1. Use a geoboard, geobands, and square dot paper.
 - a) Make 3 different acute triangles.
Draw each triangle on dot paper.
How do you know each triangle is acute?
 - b) Make 3 different obtuse triangles.
Draw each triangle on dot paper.
How do you know each triangle is obtuse?
 - c) Make 3 different right triangles.
Draw each triangle on dot paper.
How do you know each triangle is right?

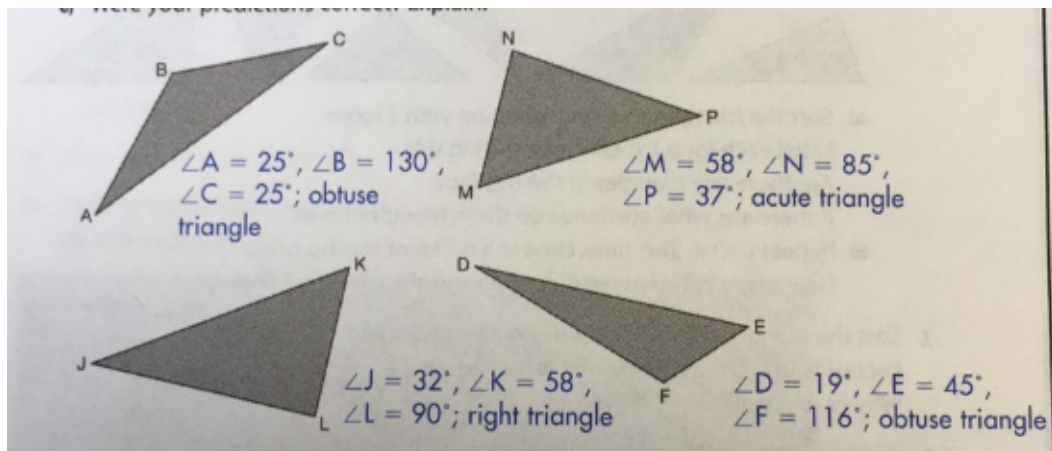


Sample Solutions

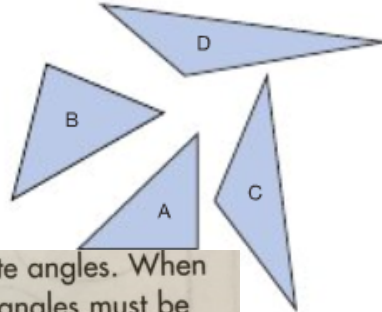
1. a) Triangles will vary.
All angles in each of the triangles are less than 90° .
- b) Triangles will vary.
Each triangle has one angle greater than 90° .
- c) Triangles will vary.
Each triangle has one 90° angle.



2. a) Predict whether each triangle is acute, obtuse, or a right triangle.
How did you make your prediction?
 2. a) $\triangle ABC$: Obtuse triangle; $\angle B$ is greater than 90° .
 $\triangle MNP$: Acute triangle; all angles are less than 90° .
 $\triangle JKL$: Right triangle; $\angle L$ is 90° .
 $\triangle DEF$: Obtuse triangle; $\angle F$ is greater than 90° .
- b) Use a protractor. Measure the angles in each triangle.
Name each triangle as an acute, an obtuse, or a right triangle.
- c) Were your predictions correct? Explain.



- ✓ 3. Akna drew these triangles. He noticed there were at least two acute angles in each triangle he drew.
 Akna made this conclusion: "All triangles must have at least two acute angles."
 Do you agree?
 Why or why not?



3. Yes, all triangles must have at least two acute angles. When one angle is obtuse or right, then the other angles must be acute or the angle sum would be greater than 180° . An acute triangle has 3 acute angles, which is "at least" 2.

$$91 + 91 + \underline{\quad} = 180 \neq$$

182

- ✓ 4. Is each statement true or false?
 Use pictures, words, or numbers to explain your thinking.

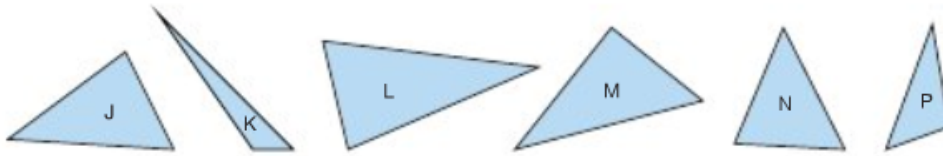
- a) A triangle can have more than one obtuse angle. **false**
 b) A triangle can have only one 90° angle. True
 c) A triangle can have 3 acute angles. True



4. a) The sum of 2 obtuse angles would be greater than 180° .
 b) The sum of 2 right angles would be 180° and there are no degrees left for the third angle.
 c) All acute triangles have 3 acute angles.



✓ 5. You will need scissors and a large copy of these triangles.



Cut out the triangles.

Sort the triangles as acute, obtuse, or right triangles.

How did you decide where to place each triangle?

Acute : J, L , N

Obtuse: K & P

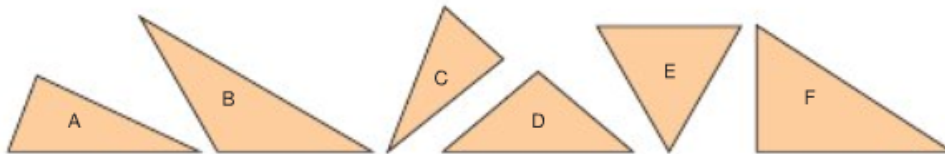
Right : M

5. Acute triangles have all angles less than 90° . Obtuse triangles have one angle greater than 90° . Right triangles have one 90° angle.



6. You will need scissors and a large copy of these triangles.

Cut out the triangles.



a) Sort the triangles in a Venn diagram with 2 loops.

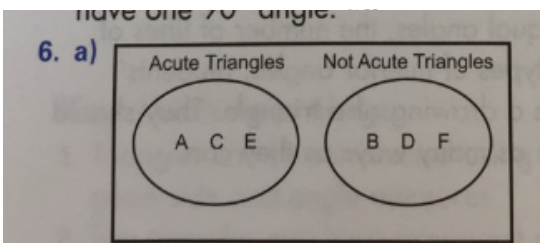
Label each loop. Explain your sorting rule.

Are there any triangles in the overlap?

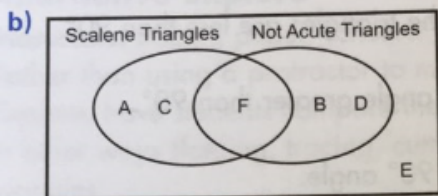
If there are, what attributes do these triangles have?

b) Repeat part a. This time, choose a different sorting rule.

How did you sort the triangles? Show your work.



There is no overlap because a triangle cannot be both acute and not acute.



There is a triangle in the overlap. Triangle F is a right triangle (not acute) with all sides of different lengths (scalene).

7. Sort the triangles in question 6 using a Venn diagram with 3 loops.
Record your work. Do any of the loops overlap?
Why or why not?

7.

None of the loops overlap because a triangle is either acute or obtuse or right. It cannot be two types at once.

8. a) Can an obtuse triangle be an equilateral triangle? Explain.
b) Can a right triangle be an isosceles triangle? Explain.

8. a) An equilateral triangle has three 60° angles. An obtuse triangle has one angle greater than 90° .
b) A right triangle can have 2 sides of the same length.

REFLECT: I can describe a triangle by the number of equal sides, the number of equal angles, the number of lines of symmetry, and by the types of interior angles. Students' answers should include a drawing of a triangle. They should describe the triangle in as many ways as they can.

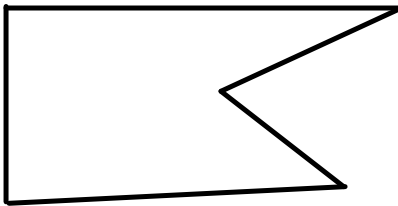
[Extend Page](#)

Study

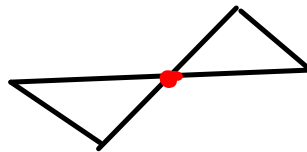
Polygons

A polygon is a closed shape with sides that are straight line segments. EXACTLY 2 sides meet at a vertex. The sides only intersect at that vertex.

This is a Polygon



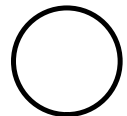
These shapes are non-polygons



more than 2 sides
meet a center vertex



Not Closed



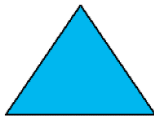
Not
made
with
straight
lines

A **regular polygon** has all equal sides and all equal angles
-Has lines of symmetries

Name _____

Date _____

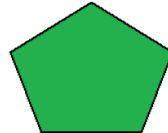
REGULAR POLYGONS 1



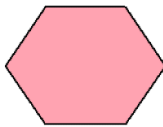
Equilateral triangle



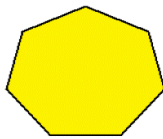
Square



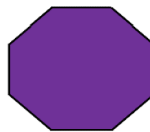
Regular Pentagon



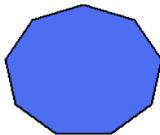
Regular Hexagon



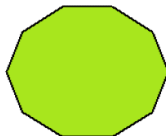
Regular Heptagon



Regular Octagon



Regular Nonagon



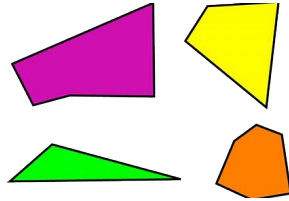
Regular Decagon



Regular Dodecagon

Study

A irregular polygon does **NOT** have all equal sides and all equal angles

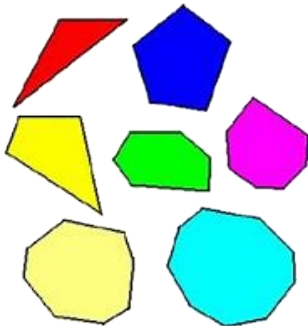


Study

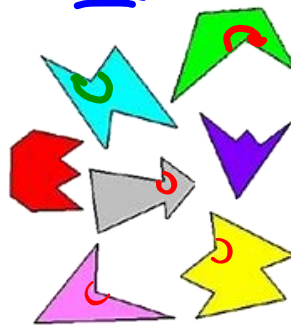
A convex polygon has all interior angles less than 180°

A convave polygon has at least 1 interior angle greater than 180°

Convex Polygons



Concave Polygons



(Reflex angle inside polygon)

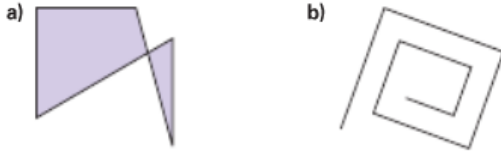
Class/Homework

Page 216-218 #1, 2, 3,4, 5, ~~6~~

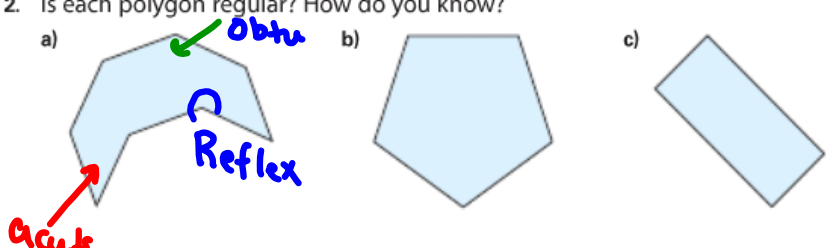
Don't need a copy just trace NEATLY

Practice

1. Explain why each shape is not a polygon.



2. Is each polygon regular? How do you know?
 a) *all equal sides*
all equal angles

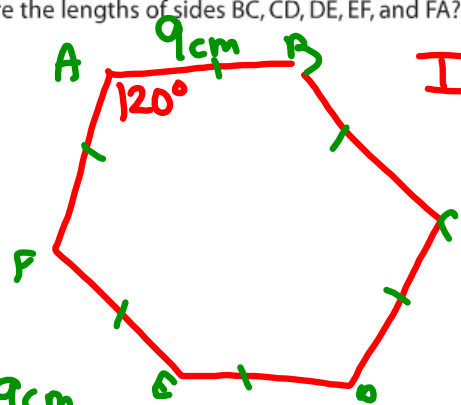


Not Regular Polygon b/c we have acute obtuse and reflex interior angles

all angles all sides are equal

3. A cell in a honeycomb approximates a regular hexagon.

- a) Suppose $\angle A = 120^\circ$. 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?



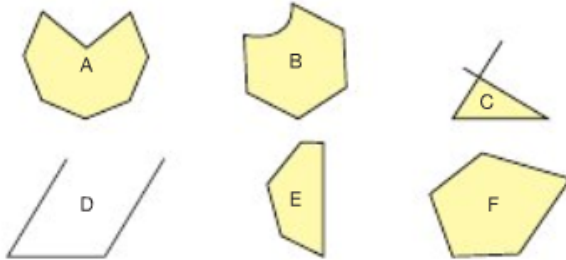
*If $\angle A = 120^\circ$
 $\angle B = 120^\circ$
 $\angle C = 120^\circ$
 $\angle D = 120^\circ$
 $\angle E = 120^\circ$
 $\angle F = 120^\circ$*

*AB = 9cm
 BC = 9cm
 CD = 9cm
 DE = 9cm
 EF = 9cm
 FA = 9cm*



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

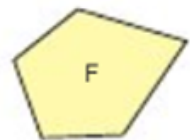
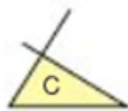
- a) Sort these shapes into sets of polygons and non-polygons. Explain how you decided where to place each shape.



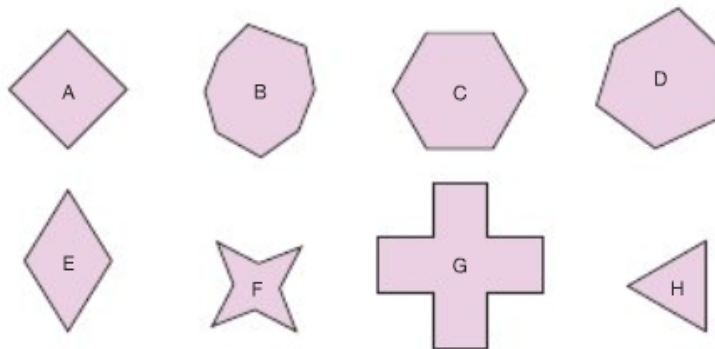
- b) Draw a different shape that belongs in each set. Explain how you know that it belongs.

Polygons

Non Polygons



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



- Which polygons appear to be regular?
- How can you check that the polygons you identified in part a are regular? Use your strategy to check.
- Sort the polygons into sets of regular and irregular polygons.
- For each set in part c, draw a different polygon that belongs in that set.
- Sort the polygons into sets of convex and concave polygons.
- For each set in part e, draw a different polygon that belongs in that set.

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



- Name the polygon that each sign reminds you of.
- Sort the signs into sets of regular and irregular polygons. Explain how you did this.



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.
8. a) What do we call:
- a regular triangle?
 - a regular quadrilateral?
- 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?
9. Can a concave quadrilateral be regular?
Explain.