

# Do Now

Please use the straws in the cup to solve this problem. You may work with your teammates.

The straw pieces in your cup have the following lengths:

yellow = 2 cm., blue = 5 cm., orange = 6 cm., green = 9 cm.

Can you make a triangle using the 5 cm., 6 cm., and 9 cm. straws?

Can you make a triangle using the 2 cm., 5 cm., and 6 cm. straws?

Can you make a triangle using the 2 cm., 5 cm., and 9 cm. straws?



Suppose you were given straws of lengths 3 in., 5 in., 8 in., and 9 in.

Predict the combinations of straws that could form a triangle.

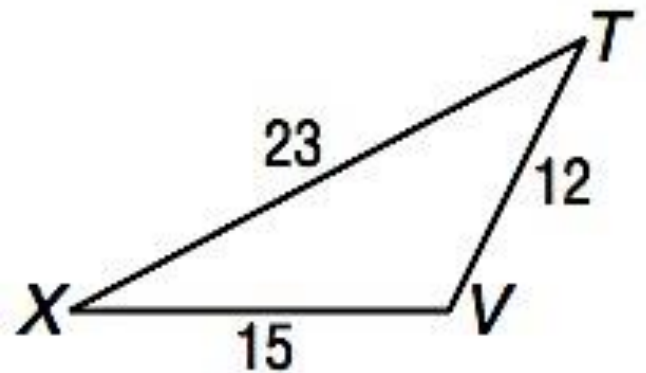
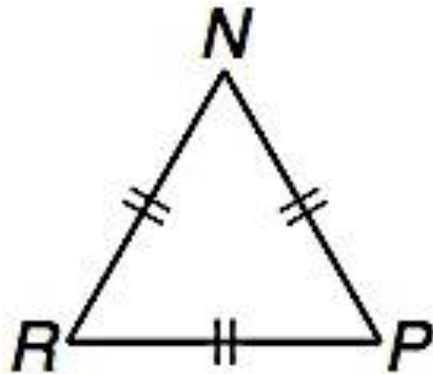
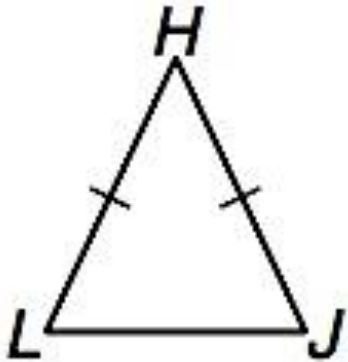
Can you make a general rule about the lengths of the sides of any triangle based on your findings?

**Triangle Inequality Theorem:** The sum of the lengths of any two sides of a triangle is greater than the length of the third side.

Example: If two sides of a triangle are 12 cm. and 18 cm., what is the possible range of lengths of the third side?

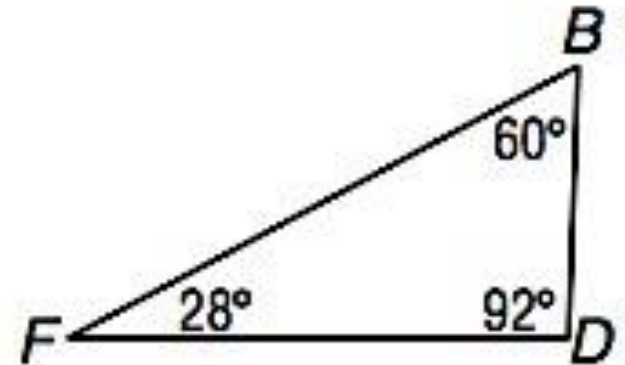
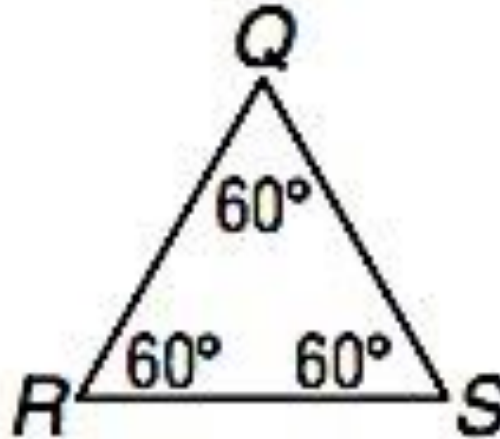
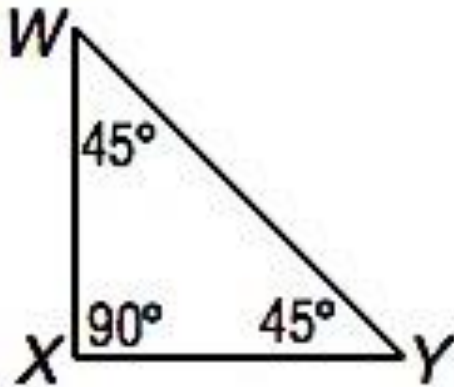
**Classify Triangles by Sides** You can classify a triangle by the measures of its sides. Equal numbers of hash marks indicate congruent sides.

- If *all three* sides of a triangle are congruent, then the triangle is an **equilateral triangle**.
- If *at least two* sides of a triangle are congruent, then the triangle is an **isosceles triangle**.  
Equilateral triangles can also be considered isosceles.
- If *no two* sides of a triangle are congruent, then the triangle is a **scalene triangle**.



**Classify Triangles by Angles** One way to classify a triangle is by the measures of its angles.

- If *one* of the angles of a triangle is an obtuse angle, then the triangle is an **obtuse triangle**.
- If *one* of the angles of a triangle is a right angle, then the triangle is a **right triangle**.
- If *all three* of the angles of a triangle are acute angles, then the triangle is an **acute triangle**.



Equilateral obtuse?

**Quadrilaterals** have four sides and four angles. The sum of the measures of the angles is  $360^\circ$ .

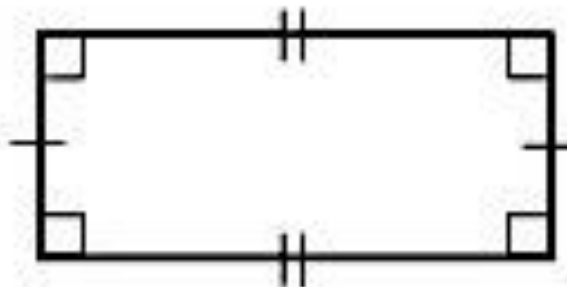
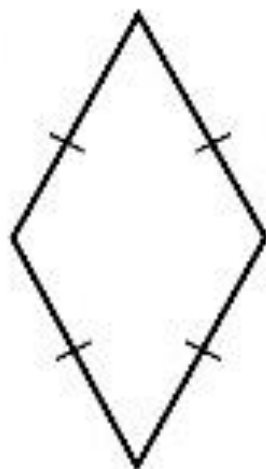
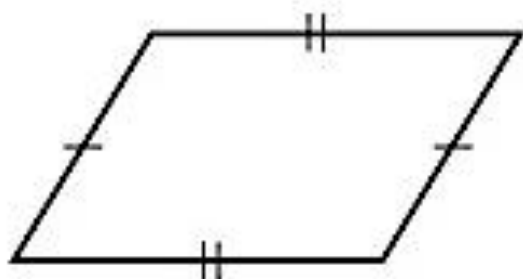
A **rectangle** has opposite sides congruent and parallel, and all right angles.

A **square** has all sides congruent, opposite sides parallel, and all right angles.

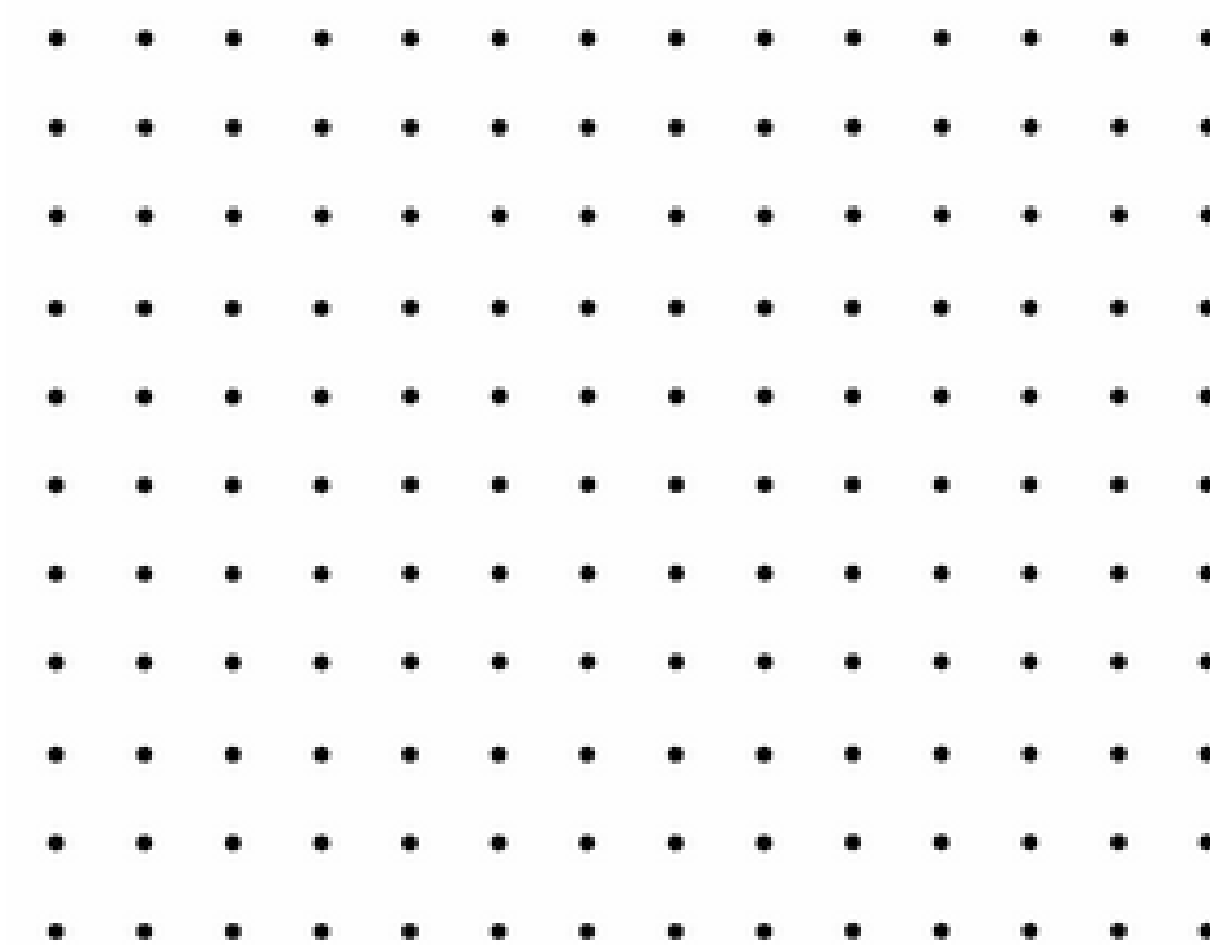
A **parallelogram** has opposite sides congruent and parallel, and opposite angles congruent.

A **rhombus** has all sides congruent, opposite sides parallel, and opposite angles congruent.

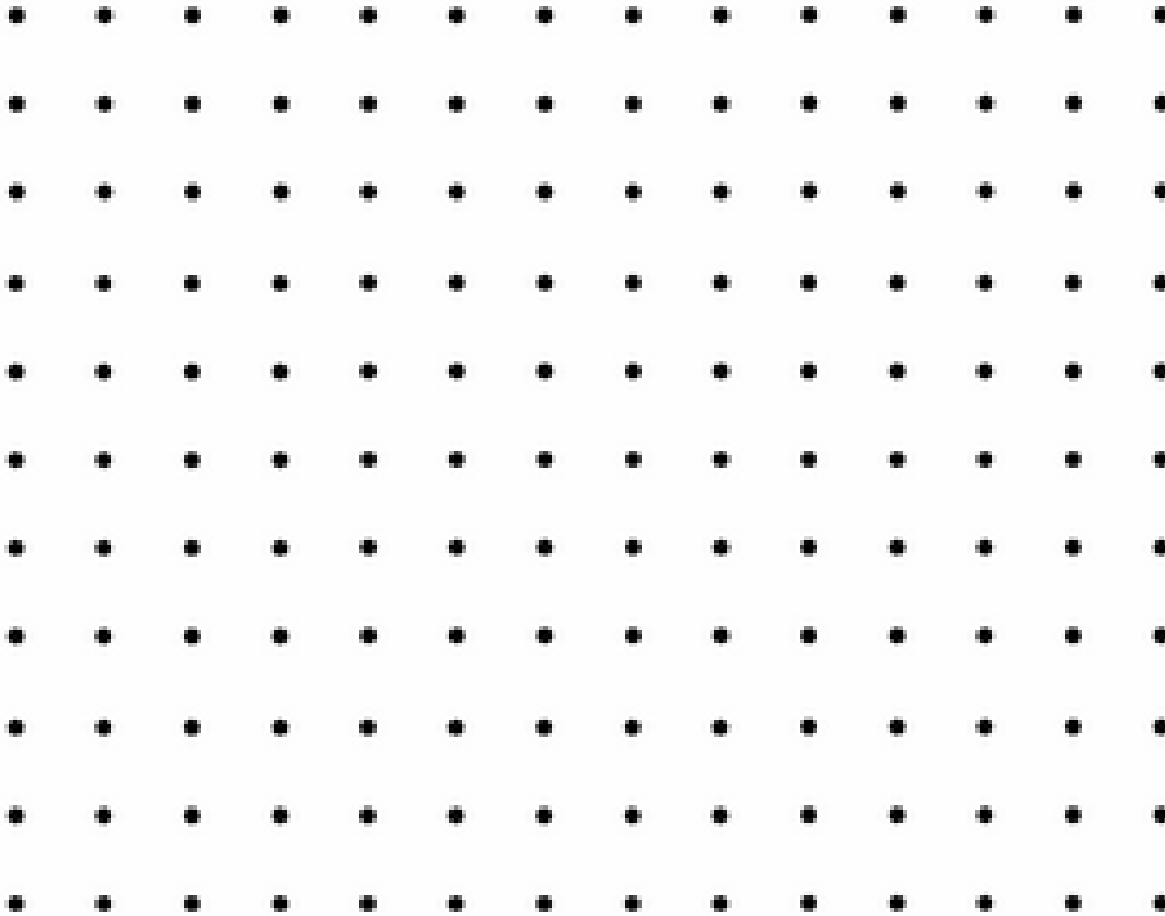
A **trapezoid** has exactly one pair of opposite sides parallel.



Connect four dots, vertices, to draw a quadrilateral with two acute and two obtuse angles. If it is impossible, explain why.



Connect four dots, vertices, to draw a quadrilateral with four obtuse angles. If it is impossible, explain why.





Connect four dots, vertices, to draw a quadrilateral with three acute angles. If it is impossible, explain why.

