Author:_____ **Angles and Triangles**

Group Members:

---

1. Can you make a right triangle with sides of length 3 cm, 5 cm and 7 cm? If so, draw one. If not, explain why not.

   $3^2 + 5^2 = 9 + 25 = 34 \neq 7^2$

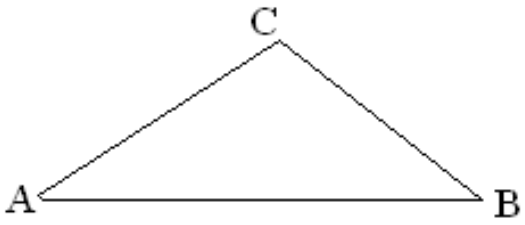
   Therefore a triangle with lengths 3cm, 5cm, and 7cm is not a right triangle.

2. Can you make a triangle with sides of length 3 cm, 5 cm and 7 cm? If so, draw one. If not, explain why not.

   Yes, you can make a triangle with these lengths.

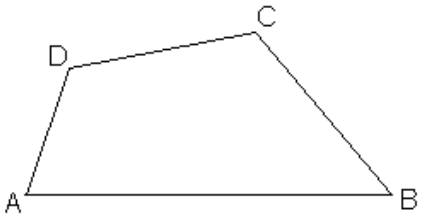
3. Can you make a triangle with sides of length 2 cm, 3 cm and 7 cm? If so, draw one. If not, explain why not.

   No. The distance between A and B is 7cm and the shortest distance between two points is a straight line. Therefore if you were to travel along the other two legs of the triangle from A to B, that has to take longer than 7cm, but 2cm plus 3cm is not longer than 7cm.

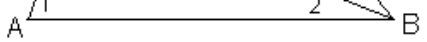


Recall that the sum of the angles in a triangle is 180°. We would like to find out what the sum of the angles in other polygons would be.

4. Consider the quadrilateral below. You will work on finding $\angle A + \angle B + \angle C + \angle D$.



Draw in the line to form two triangles and label the angles as below. Find the following.

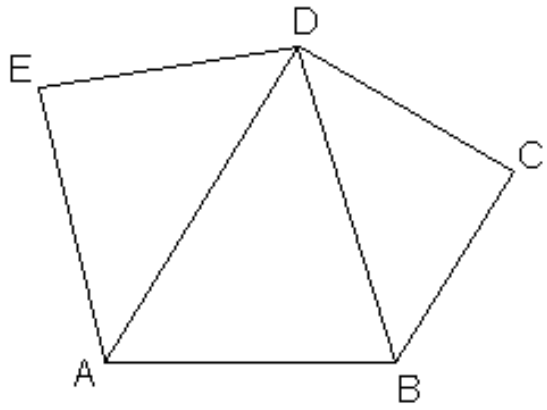


$\angle 1 + \angle 2 + \angle 3 = 180°$

$\angle 4 + \angle 5 + \angle 6 = 180°$

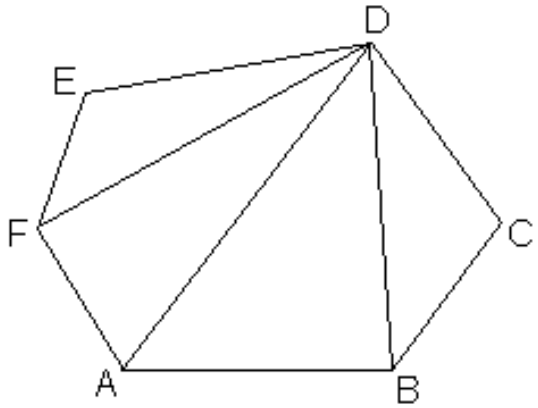
$\angle A + \angle B + \angle C + \angle D = 360°$

5. Use a similar method to find the sum of the angles in the pentagon below.



There are 3 triangles, so the total sum of the angles is $3(180) = 540°$.

6. Use a similar method to find the sum of the angles in the hexagon below.



There are 4 triangles, so the total sum of the angles is $4(180) = 720°$.

7. Use a similar method to find the sum of the angles in the heptagon below.

There are 5 triangles, so the total sum of the angles is $5(180) = 900°$.

8. What do you think the sum of the angles in an octagon would be?

   $6(180) = 1080°$

9. Extending the ideas you used above, find a formula for the sum of the angles in an n-gon .

   Sum of the angles $= (n-2)180$.

10. What is the measure of one of the angles in a regular pentagon?

    sum of angles $= 3(180°) = 540°$

    one angle $= 540° \div 5 = 108°$

11. What is the measure of one of the angles in a regular decagon?

    sum of angles $= 8(180°) = 1440°$

    one angle $= 1440° \div 10 = 144°$

12. If one of the angles in a parallelogram is $40°$, what must the measure of the other angles be?

    Opposite angles are equal in a parallelogram and the sum of all the angles must be $360°$, so the two opposite angles must be 40^circ and the other two opposite angles must be $140°$.

13. If one of the angles in an isosceles triangle is $40°$, what must the measure of the other angles be?

    This depends on if $40°$ is opposite one of the sides that are equal or not. Therefore there are two possibilities.

    $40°, 40°, 100°$ or $40°, 70°, 70°$.