



# Angles in Polygons Answers

## Warm up

1. What is the sum of the interior angles of a triangle?  **$180^\circ$**
2. What is the sum of the interior angles of a quadrilateral?  **$360^\circ$**
3. Describe an equilateral triangle. **A triangle with all sides the same length and each angle is  $60^\circ$**
4. Describe an isosceles triangle. **A triangle with two equal sides and two equal angles.**

## Stage 1

Find the exterior angle given the following interior angles.

1.  $60^\circ$   **$120^\circ$**
2.  $90^\circ$   **$90^\circ$**
3.  $120^\circ$   **$60^\circ$**
4.  $108^\circ$   **$72^\circ$**
5.  $135^\circ$   **$45^\circ$**
6.  $144^\circ$   **$36^\circ$**

## Stage 2

Find the sum of the interior angles and the value of one interior angle for the following regular polygons.

1. Triangle sum of interior angles =  **$180^\circ$**  interior angle =  **$60^\circ$**
2. Pentagon sum of interior angles =  **$540^\circ$**  interior angle =  **$108^\circ$**
3. Octagon sum of interior angles =  **$1080^\circ$**  interior angle =  **$135^\circ$**
4. Hexagon sum of interior angles =  **$720^\circ$**  interior angle =  **$120^\circ$**
5. Nonagon (9 sides) sum of interior angles =  **$1260^\circ$**  interior angle =  **$140^\circ$**
6. Heptagon (7 sides) sum of interior angles =  **$900^\circ$**  interior angle =  **$128.57^\circ$**

## Stage 3

Find the interior and exterior angle for regular polygons with the following number of sides:

1. Decagon (10 sides) interior angles =  **$144^\circ$**  exterior angle =  **$36^\circ$**
2. Heptagon (7 sides) interior angles =  **$128.57^\circ$**  exterior angle =  **$51.43^\circ$**
3. 15 sides interior angles =  **$156^\circ$**  exterior angle =  **$24^\circ$**
4. 24 sides interior angles =  **$165^\circ$**  exterior angle =  **$15^\circ$**

## Stage 4

Find the number of sides of the regular polygons with the following **exterior** angles.

1.  $72^\circ$       **5 sides**
2.  $18^\circ$       **20 sides**
3.  $45^\circ$       **8 sides**
4.  $10^\circ$       **36 sides**

## Stage 5

Find the number of sides of the regular polygons with the following **interior** angles.

1.  $90^\circ$       **4 sides**
2.  $150^\circ$       **12 sides**
3.  $174^\circ$       **60 sides**
4.  $165^\circ$       **24 sides**

## Stage 6

Find the value of angle  $x$  in each diagram below.

