

Angles in Regular Polygons

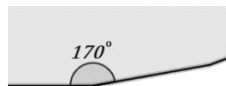
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(1) Complete the table below for **REGULAR** polygons. The first one is done for you.

# of Sides	Size of each Exterior Angle	Size of each Interior Angle	Sum of Interior Angles
8 (Octagon)	45°	135°	1080°
12			
9			
	20°		
		150°	
	2°		
			2880°
		171°	
n			

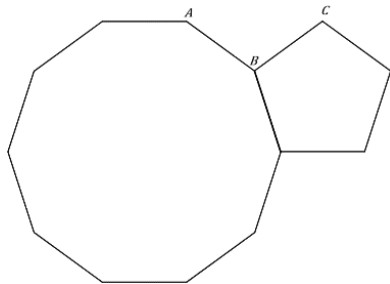
(2) Part of a regular polygon is shown below with interior angle of 170° .

Show that the polygon has 36 sides.



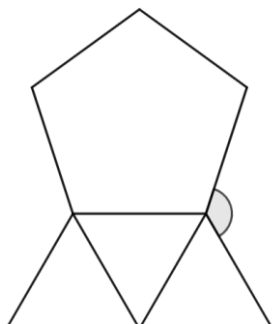
(3) Fred says he has found a regular polygon where each interior angle is 163° . Show that he is incorrect.

(4) The diagram below shows two regular polygons with a common side.



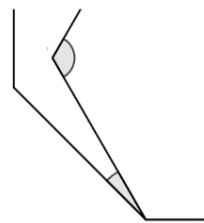
Find the size of $\angle ABC$.

(5) The diagram below shows 4 regular polygons all of which have equal side lengths.



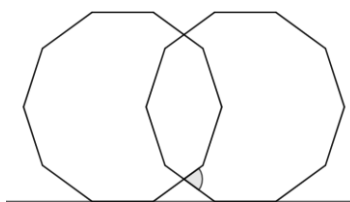
Find the size of the shaded angle shown.

(6) The diagram below shows part of two regular polygons that share the same base. The two angles shown are 120° and 15° .



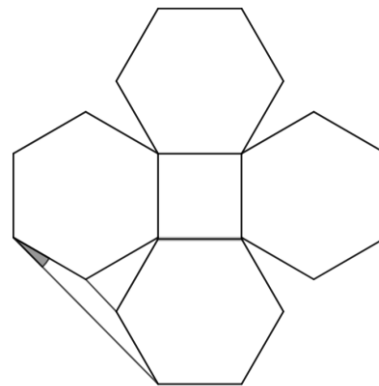
Name the polygons shown in the diagram.

(7) The diagram below shows 2 congruent decagons. Their bases are parallel and at the same height.



Find the size of the shaded angle.

(8) The diagram below shows 4 regular hexagons that meet to form a square. Two straight lines have been drawn that connect the vertices of two of the hexagons.

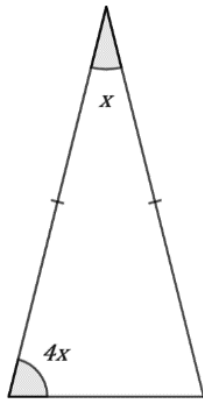


Find the size of the shaded angle.

(9) Fred has n sided regular polygon. The size of the interior angle is 14 times that of the exterior angle. Find the value of n .

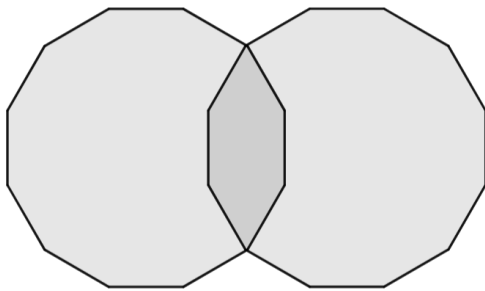
(10) A regular polygon has N sides where N is an even integer less than 40. The sizes of both the interior and exterior angles of the polygon have integer values. Find the maximum value of N .

(11) An isosceles triangle is shown below.



n of these congruent triangles are joined without gaps to form a regular polygon. How many sides does the polygon have?

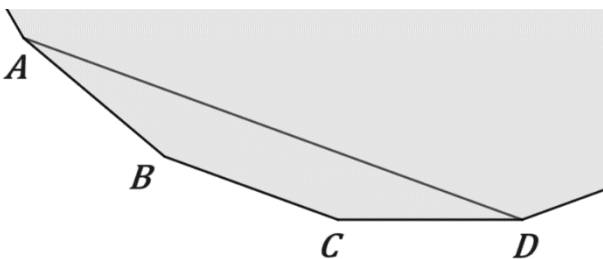
(12) Two congruent regular polygons are shown below. They intersect and form a shaded irregular polygon as shown below.



Find the size of the smallest angle in the irregular polygon.

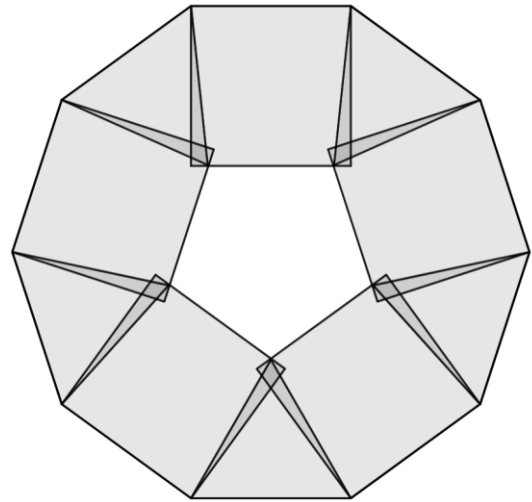
(13) A regular polygon P has p sides and exterior angle θ . Find a simplified expression for the sum of the interior angles of P in terms of p and θ .

(14) The diagram below shows part of a regular polygon.



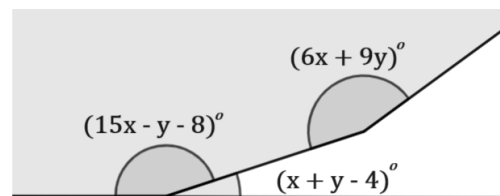
A, B, C and D are the vertices of the polygon. The line AD is parallel to the line BC . Given $\angle DAB = 20^\circ$, find the number of sides of the polygon.

(15) The diagram below shows a regular decagon. Squares and equilateral triangles are formed on alternating sides of the decagon and overlap as shown below. The side lengths of the decagon, squares and triangles are equal.



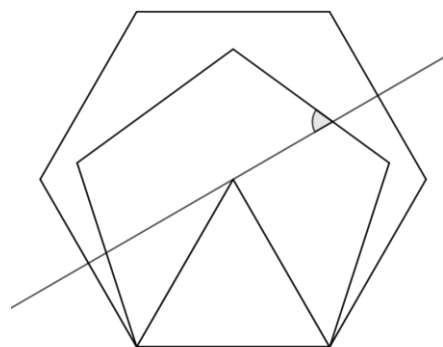
Prove that the unshaded pentagon in the middle of the decagon is regular.

(15) The diagram below shows part of a shaded regular polygon. The sizes of 2 interior angles and 1 exterior angle are given as algebraic expressions.



Find the number of sides the polygon has.

(16) The diagram shows 3 different regular polygons that share the same base. The line shown is a perpendicular bisector of two of the sides of the hexagon.



Find the size of the shaded angle.