

Question 6: Each of the polygons below are regular.
Calculate the size of each exterior angle, y .

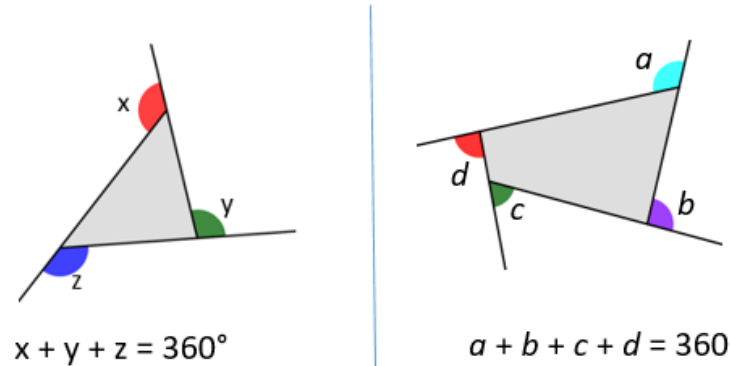
SUPPORT

(a) $y=72$ ✓ (b) $y=60$ ✓ (c) $y=45$ ✓

regular pentagon regular hexagon regular octagon

Exterior Angles Memory

The sum of the exterior angles of any polygon is 360° .
The exterior angle of a regular n -sided polygon is $\frac{360^\circ}{n}$



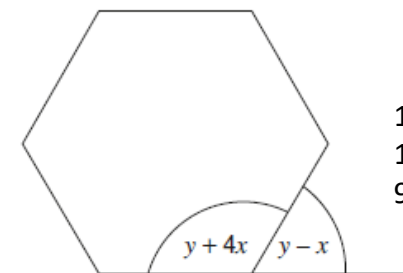
TASK

Question 7: Calculate the size of each exterior angle in regular polygons with

(a) 15 sides	24 ✓	(b) 18 sides	20 ✓	(c) 20 sides	18 ✓	(d) 24 sides	15 ✓
(e) 30 sides	12 ✓	(f) 36 sides	10 ✓	(g) 40 sides	9 ✓	(h) 45 sides	8 ✓
(i) 60 sides	6 ✓	(j) 72 sides	5 ✓	(k) 90 sides	4 ✓	(l) 200 sides	1.8 ✓

PROBLEM SOLVING

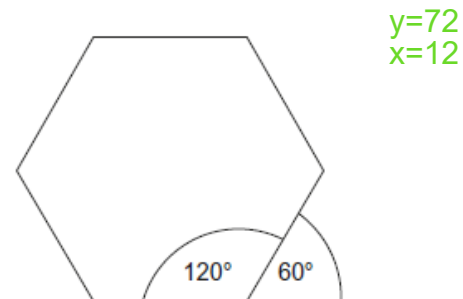
The diagram shows two regular hexagons with the base lines extended.



Work out the values of x and y .

$$\begin{aligned} 120/4 &= 30 \\ 120 - 30 &= 90 \\ 90 - 30 &= 60 \end{aligned}$$

$x=30$
 $y=90$



CHALLENGE

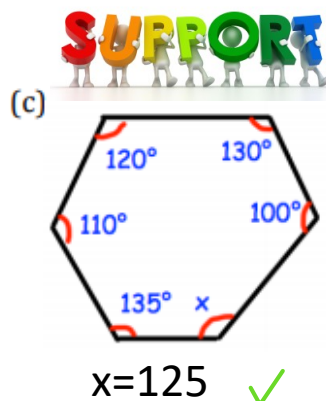
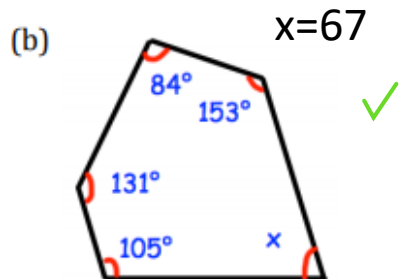
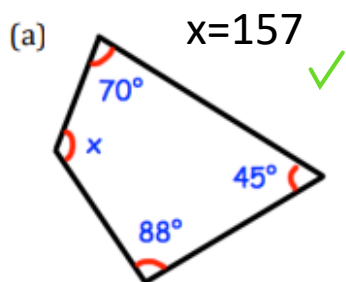
Question 1: A regular polygon has 18 sides. Calculate the size of each interior angle. $180/18=10$ ✗ $(18-2) \times 180 = 2880$ $2880/18 = 160$

Question 2: A regular polygon has 30 sides. Calculate the size of each interior angle. $180/30=60$ ✗ $(30-2) \times 180 = 5040$ $5040/30 = 168$

Question 3: A polygon has an interior angle that is five times larger than the exterior angle. How many sides does it have? ✗ $6x=180$ so $x=30$
 $360/30=12$ 12 sides $5x=150$ $(12-2) \times 180 = 1800$ $1800/12 = 150$

Question 4: Explain why regular hexagons tessellate. ✗

Question 1: Find the missing angle in each irregular polygon



Memory

If a shape is regular, all of its angles are the same size.

Equilateral Triangle

Total = 180°
One angle = $180 \div 3 = 60^\circ$

Square

Total = 360°
One angle = $360 \div 4 = 90^\circ$

Regular Pentagon

Total = 540°
One angle = $540 \div 5 = 108^\circ$

If the polygon has n sides, the angle sum is $(n - 2) \times 180$.

Divide this answer by n to get the size of one angle.

Regular Hexagon

Total = 720°
One angle = $720 \div 6 = 120^\circ$

Regular Heptagon

Total = 900°
One angle = $900 \div 7 = 128.5...$

Regular Octagon

Total = 1080°
One angle = $1080 \div 8 = 135^\circ$

$$\frac{180(n - 2)}{n}$$

TASK

Question 2: Work out the sum of the interior angles for polygons with

- (a) 10 sides 1440 ✓ (b) 14 sides 2160 ✓ (c) 20 sides 3240 ✓ (d) 45 sides 7740 ✓
- (e) 50 sides 8640 ✓ (f) 80 sides 14040 ✓ (g) 100 sides 17640 ✓ (h) 200 sides 35640 ✓

Question 3: Work out the number of sides of polygons with these sum of interior angles

- (a) 1260° 9 ✓ (b) 2880° 18 ✓ (c) 3960° 24 ✓ (d) 5040° 30 ✓
- (e) 12240° 70 ✓ (f) 15840° 90 ✓ (g) 2340° 15 ✓ (h) 89640° 500 ✓

CHALLENGE

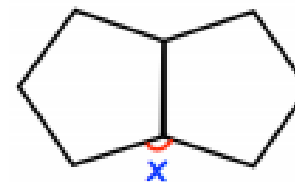
Question 5: Calculate the size of each interior angle in regular polygons with

- (a) 15 sides 156 (b) 20 sides 162 (c) 24 sides 165 (d) 30 sides 168
- (e) 36 sides 170 (f) 40 sides 171 (g) 50 sides 172.8 (h) 60 sides 174
- (i) 72 sides 175 (j) 80 sides 175.5 (k) 90 sides 176 (l) 100 sides 176.4

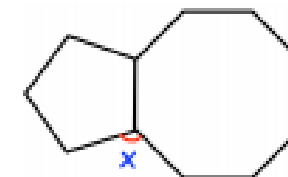
PROBLEM SOLVING

Question 1: In each diagram below, two regular polygons are shown. Calculate x .

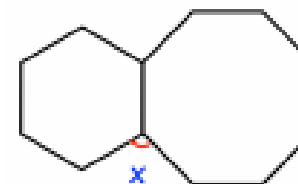
(a)



(b)



(c)



(d)

