

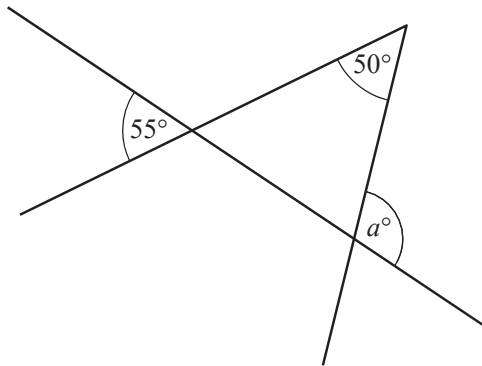


EXAM PAPERS PRACTICE

Angles in Polygons

Model Answer

Question 1



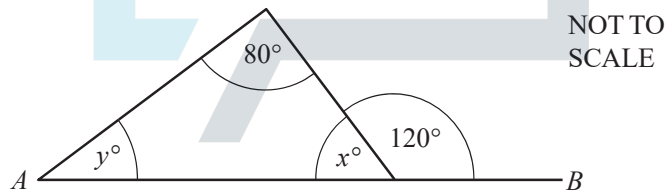
NOT TO SCALE

Use the information in the diagram to find the value of a .

$$a = 55^\circ + 50^\circ = 105^\circ$$

[2]

Question 2



NOT TO SCALE

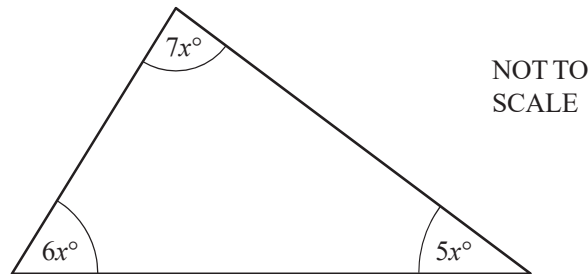
In the diagram, AB is a straight line.

Find the value of x and the value of y .

[2]

$$x \text{ are } 60^\circ \text{ and } y = 40^\circ$$

The three angles in a triangle are $5x^\circ$, $6x^\circ$ and $7x^\circ$.



- (a) Find the value of x . [2]

$$\text{Sum of angle of triangle} = 5x + 6x + 7x$$

$$\text{Sum of angle of triangle} = 18x$$

$$180^\circ = 18x$$

$$\implies x = \frac{180^\circ}{18}$$

$$\implies x = 10^\circ$$

- (b) Work out the size of the largest angle in the triangle. [1]

$$\text{Largest angle} = 7x$$

$$\text{Largest angle} = 7(10^\circ)$$

$$\text{Largest angle} = 70^\circ$$

Exam Papers Practice

Question 4

Five angles of a hexagon are each 115° .

Calculate the size of the sixth angle. [3]

Five angle of hexagon is 115° each sum of all angles of hexagon = 720

\therefore let sixth angle of hexagon be x

$$x + 115 + 115 + 115 + 115 + 115 = 720$$

$$x + 575 = 720$$

$$x = 720 - 575$$

$$x = 145^\circ$$

A regular polygon has an interior angle of 172° .

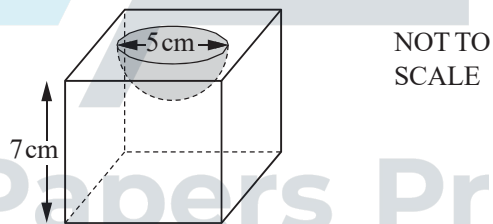
Find the number of sides of this polygon.

[3]

The regular polygon has 45 sides.

Question 6

A solid consists of a metal cube with a hemisphere cut out of it.



The length of a side of the cube is 7 cm.
The diameter of the hemisphere is 5 cm.

Calculate the volume of this solid.

[The volume, V , of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]

[3]

The volume of the solid is $343 - \frac{5^3}{12} \approx 325.73$ cubic centimeters.

Find the sum of the interior angles of a 25-sided polygon.

[2]

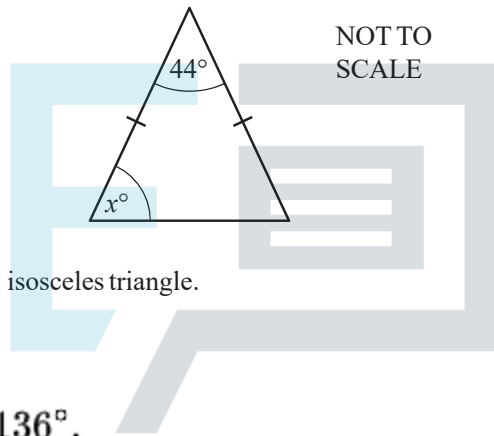
Sum of interior angles of a polygon = $180^\circ(n - 2)$ where, n = number of sides

When $n = 25$

Sum of interior angles of a polygon = $180^\circ(n - 2) = 180^\circ(25 - 2) = 4140^\circ$

Question 8

(a)



The diagram shows an isosceles triangle.

Find the value of x .

[1]

$$180^\circ - 44^\circ = 136^\circ.$$

$$136^\circ / 2 = 68^\circ.$$

Exam Papers Practice

(b) The exterior angle of a regular polygon is 24° .

Find the number of sides of this regular polygon.

[2]

Sum of all exterior angles is 360°

Let the sides of polygon be n

$$24 \times n = 360$$

$$\text{So } n = \frac{360}{24} = 15$$

Question 9

Find the interior angle of a regular polygon with 18 sides.

[3]

Steps to solve:

1. Substitute the number of sides into the formula:

$$i_{18} = \frac{180(18-2)}{18}$$

2. Simplify the expression:

$$i_{18} = \frac{180(16)}{18}$$

3. Divide the numerator and denominator by 2 :

$$i_{18} = \frac{2880}{18}$$

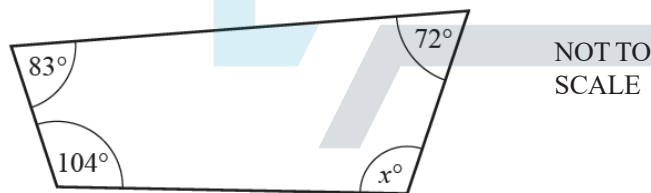
4. Simplify the fraction:

$$i_{18} = 160$$

Answer:

The interior angle of a regular polygon with 18 sides is 160 degrees.

Question 10



The diagram shows a quadrilateral.

Find the value of x .

[1]

The angles of a quadrilateral add up to 360 degrees, so we have:

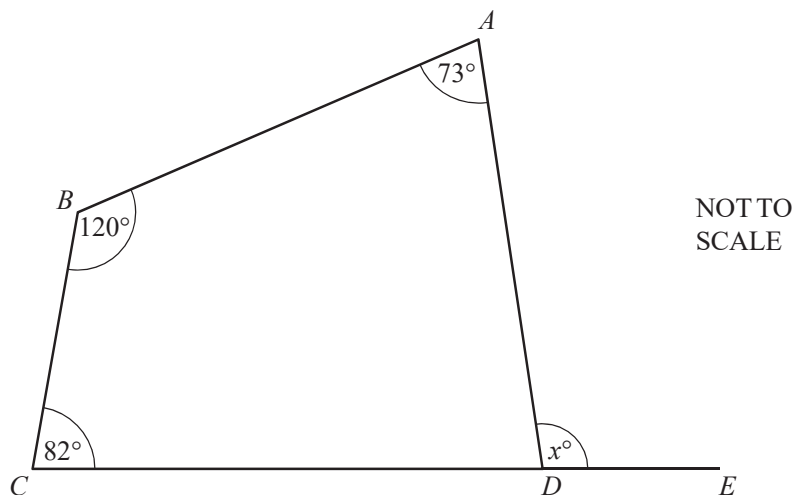
$$83 + 72 + 104 + x = 360$$

Solving for x , we get:

$$x = 360 - 83 - 72 - 104$$

$$x = 101$$

Therefore, the value of x is 101 .



The diagram shows a quadrilateral $ABCD$.
 CDE is a straight line.

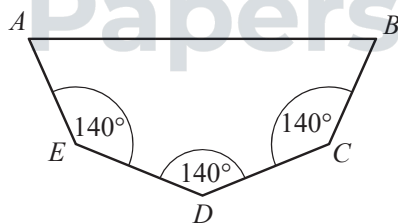
Calculate the value of x .

95

[2]

Question 12

Exam Papers Practice

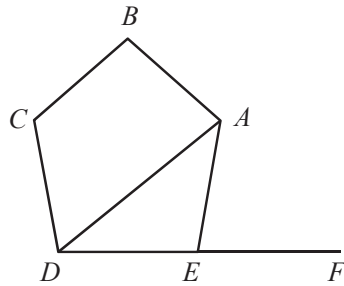


NOT TO SCALE

The pentagon has three angles which are each 140° .
 The other two interior angles are equal.
 Calculate the size of one of these angles.

[3]

The size of 1 of the 2 equal angles = 60°

NOT TO
SCALE

$ABCDE$ is a regular pentagon.

DEF is a straight line.

Calculate

(a) angle AEF ,

$$\angle AEF = 72^\circ$$

[2]

(b) angle DAE .

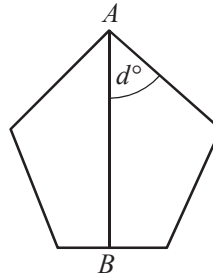
$$\angle DAE = 36^\circ$$

[1]


Exam Papers Practice

The diagram shows a regular pentagon.
 AB is a line of symmetry.

Work out the value of d .



NOT TO
SCALE

[3]

According to the diagram, each angle will be $d + d = 2d$

Sum of all angles of the pentagon = 540

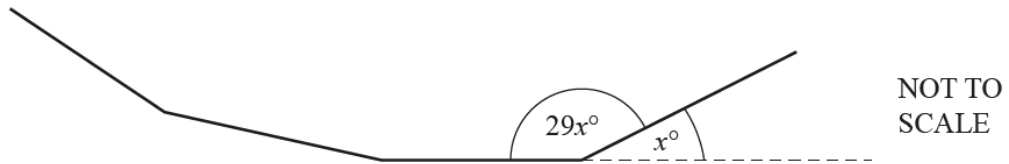
$$2d \times 5 = 540$$

$$10d = 540$$

$$d = 540/10$$

$$d = 54$$


Exam Papers Practice



The diagram shows part of a regular polygon.
 The exterior angle is x° .
 The interior angle is $29x^\circ$.

Work out the number of sides of this polygon.

[3]

$$29x + x = 180^\circ$$

$$30x = 180$$

$$x = 6^\circ$$

x is external angle

we know:

$$\text{external angle} = \frac{360}{n}$$

where n is no. of sider of the polygon

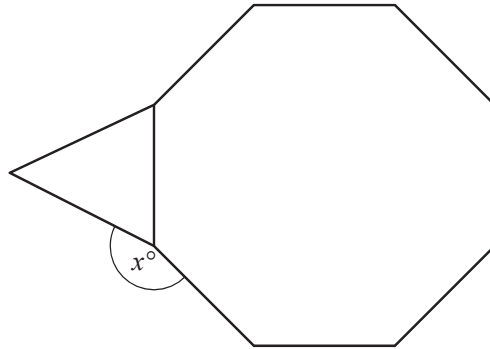
$$\Rightarrow 6 = \frac{360}{n}$$

$$n = 60$$

No of sides of polygon = 60

Exam Papers Practice

The diagram shows a regular octagon joined to an equilateral triangle.



NOT TO
SCALE

Work out the value of x .

[3]

The measure of the interior angle in an equilateral triangle is equal to 60 degrees

The measure of the interior angle in a regular octagon is equal to

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

where

n is the number of sides

In this problem we have

$n = 8$ sides

substitute

$$\frac{(8-2)180}{8}$$

$$\frac{(6)180}{8} = 135^\circ$$

we have that, based in the diagram

The sum of the interior angle of the equilateral triangle plus the interior angle of a regular octagon x must be equal to 360 degrees (complete circle)

So

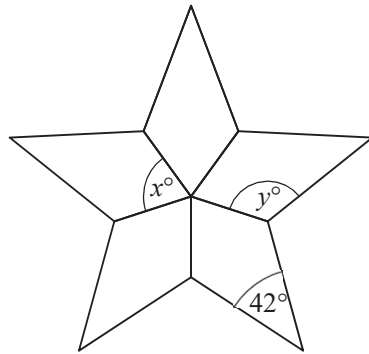
$$x + 60^\circ + 135^\circ = 360^\circ$$

solve for x

$$x + 195^\circ = 360^\circ$$

$$x = 360^\circ - 195^\circ$$

$$x = 165^\circ$$



NOT TO
SCALE

The diagram is made from 5 congruent kites.

Work out the value of

(a) x , [1]

$$x : \frac{360}{5} = 72^\circ$$

(b) y . [2]

$$y : 42 + 72 = 114^\circ$$

$$360 - 114 = 246^\circ$$

$$\frac{246}{2} = 123^\circ$$

Exam Papers Practice

Question 18

The exterior angle of a regular polygon is 36° .

What is the name of this polygon? [3]

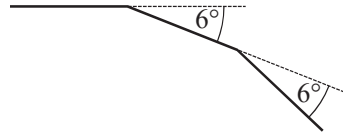
Answer:

the polygon name is decagon

Step-by-step explanation: sum exterior angles is 360 10 sides

$$360 \div 10 = 36$$

Question 19

NOT TO
SCALE

The diagram shows two of the exterior angles of a regular polygon with n sides.
Calculate n .

[2]

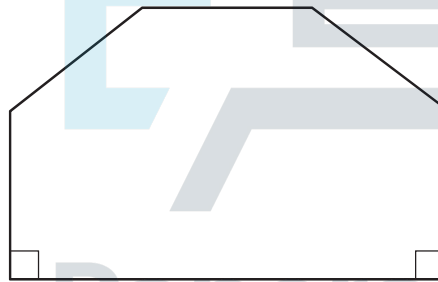
$$n = 360^\circ / \text{exterior angle}$$

In the diagram, the two exterior angles are labeled 6° , so the number of sides is:

$$n = 360^\circ / 6^\circ = 60$$

Therefore, the regular polygon in the diagram has 60 sides.

Question 20

NOT TO
SCALE

The front of a house is in the shape of a hexagon with two right angles.
The other four angles are all the same size.

Calculate the size of one of these angles.

[3]

Answer: 135°

Step-by-step explanation:

The sum of the interior angles of the hexagon is $(6 - 2) * 180^\circ = 720^\circ$

Two angles are right: $2 * 90^\circ = 180^\circ$

The sum of the four angles is $720^\circ - 180^\circ = 540^\circ$

Each angle is $540^\circ / 4 = 135^\circ$