

Angles in Polygons & Parallel Lines

Angles around Points & Lines / Angles in Triangles / Angles in Quadrilaterals / Angles in Polygons / Angles in Parallel Lines

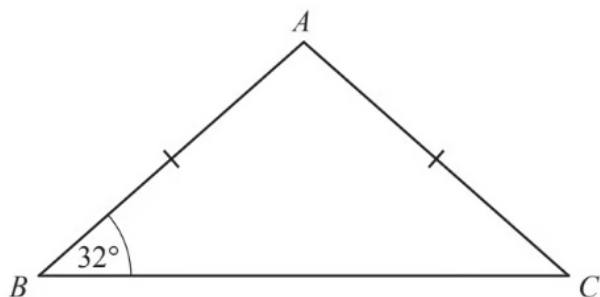
Easy (12 questions)	/24
Medium (16 questions)	/48
Hard (14 questions)	/45
Total Marks	/117

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Easy Questions

1



NOT TO
SCALE

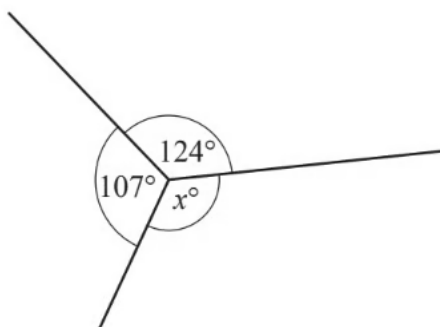
Triangle ABC is isosceles.
Angle $ABC = 32^\circ$ and $AB = AC$.

Find angle BAC .

Angle $BAC = \dots\dots\dots$

(2 marks)

2



NOT TO
SCALE

Work out the value of x .
Give a geometrical reason for your answer.

$x = \dots\dots\dots$ because $\dots\dots\dots$

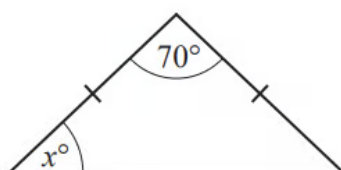
(2 marks)

- 3 A student measures the angles in a triangle as 55° , 85° and 50° .

Explain why the student is incorrect.

(1 mark)

4



NOT TO
SCALE

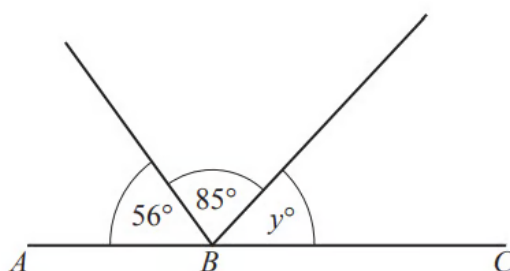
The diagram shows an isosceles triangle.

Find the value of x .

$x = \dots\dots\dots$

(2 marks)

- 5 ABC is a straight line.



NOT TO
SCALE

Find the value of y .

$y = \dots\dots\dots$

(1 mark)

6 Work out the size of one interior angle of a regular 16-sided polygon.

(2 marks)

7 Work out the size of one interior angle of a regular 9-sided polygon.

(2 marks)

8 i) Write down the mathematical name for an 8-sided polygon.

[1]

ii) Work out the size of an interior angle of a regular 24-sided polygon.

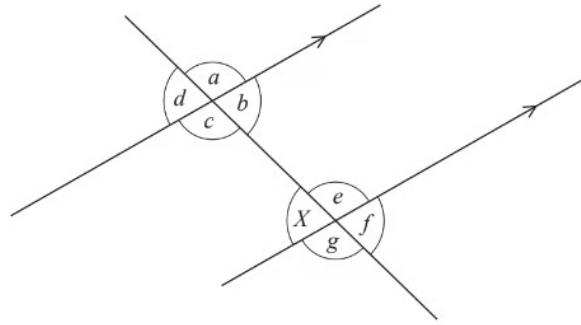
[2]

(1 mark)

9 Find the size of one interior angle of a regular octagon.

(3 marks)

10 (a)



The diagram shows two parallel lines and a straight line crossing them.

Write down, using letters from a to g ,

the angle that is alternate to angle X ,

(1 mark)

(b) the angle that is corresponding to angle X .

(1 mark)

11 Find the size of one interior angle of a regular 10-sided polygon.

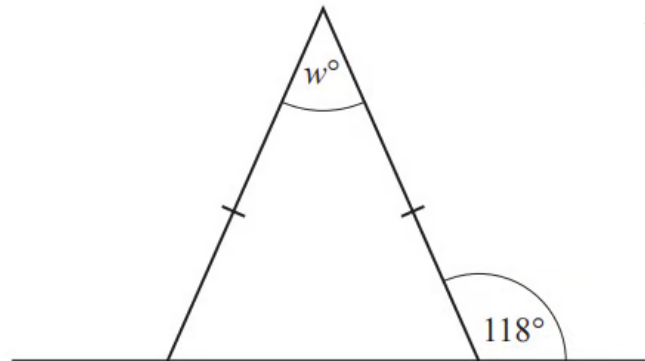
(3 marks)

12 Work out the size of one interior angle of a regular polygon with 20 sides.

(3 marks)

Medium Questions

1



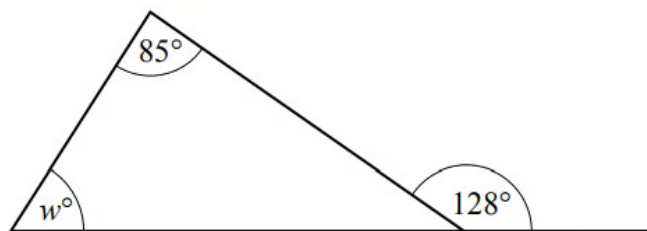
NOT TO
SCALE

The diagram shows an isosceles triangle and a straight line.
Work out the value of w .

$w = \dots\dots\dots[2]$

(2 marks)

2



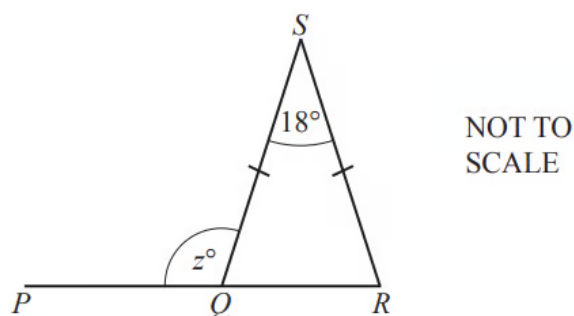
NOT TO
SCALE

Work out the value of w .
Give reasons for your answer.

$w = \dots\dots\dots$ because $\dots\dots\dots$

(3 marks)

3 QRS is an isosceles triangle and PQR is a straight line.

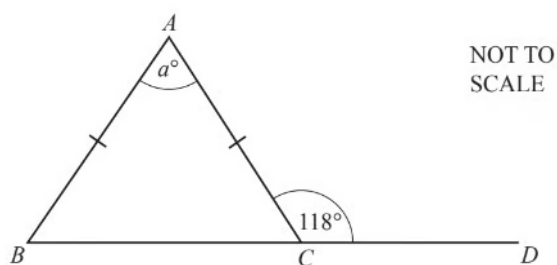


Find the value of z .

$z = \dots\dots\dots$

(2 marks)

4



ABC is an isosceles triangle.

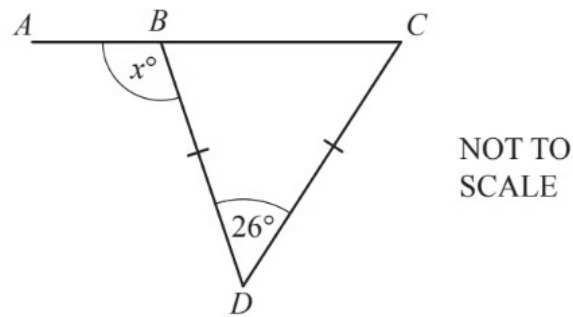
BCD is a straight line.

Find the value of a .

$a = \dots\dots\dots$

(2 marks)

5

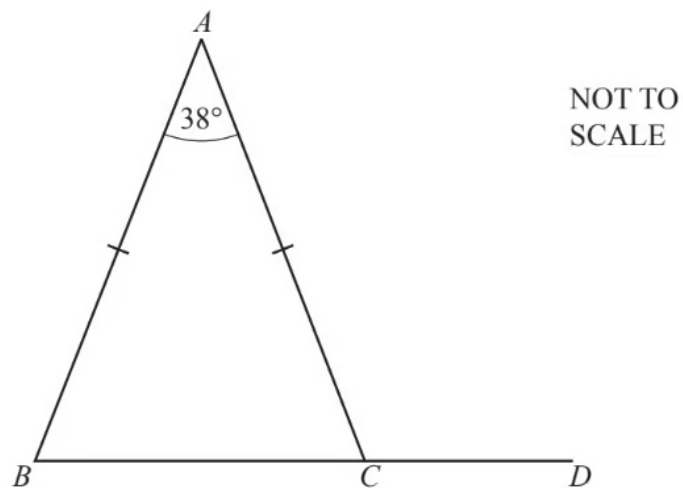


ABC is a straight line and BCD is an isosceles triangle.
Find the value of x .

$x = \dots\dots\dots$

(2 marks)

6



In the triangle ABC , $AB = AC$ and angle $BAC = 38^\circ$.

BCD is a straight line.

Work out angle ACD .

Angle $ACD = \dots\dots\dots$

(3 marks)

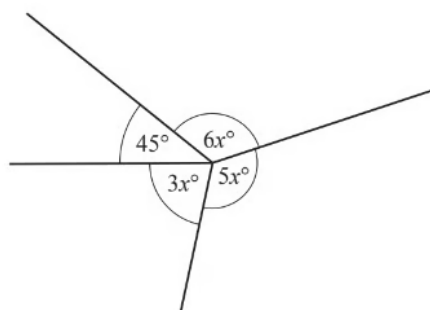
- 7 (a) A triangle is isosceles.
One of its angles is 96° .

Find the other two angles.

..... and

(1 mark)

(b)



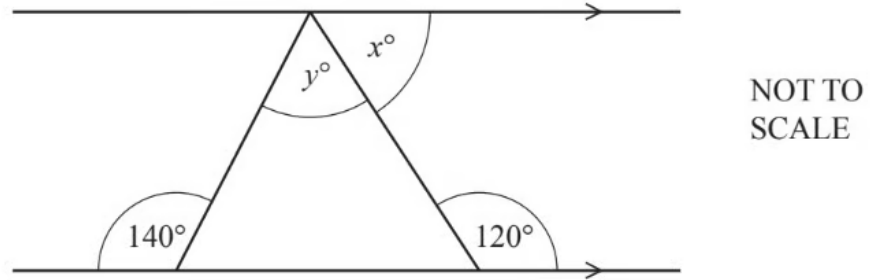
NOT TO
SCALE

Find the value of x .

$x =$

(4 marks)

8



The diagram shows a triangle drawn between a pair of parallel lines.

Find the value of x and the value of y .

$x =$

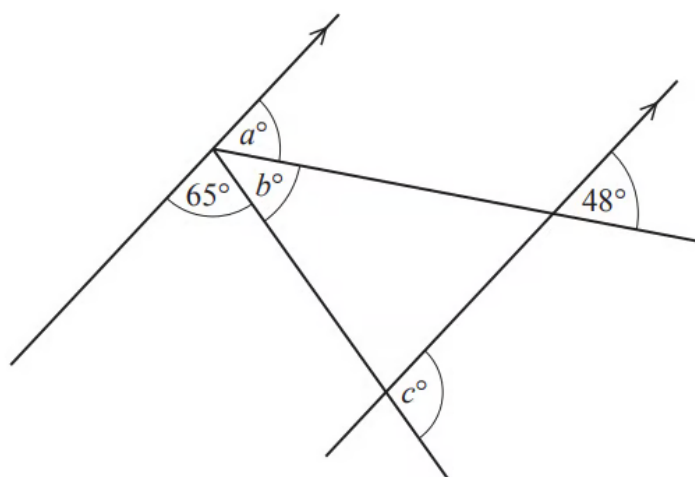
$y =$

(3 marks)

9 A regular polygon has an exterior angle of 20° .

Work out the number of sides of this polygon.

(1 mark)



NOT TO
SCALE

The diagram shows two parallel lines and two straight lines.

i) Find the value of a .

Give a reason for your answer.

$a = \dots\dots\dots$ because $\dots\dots\dots$ [2]

ii) Find the value of b .

Give a reason for your answer.

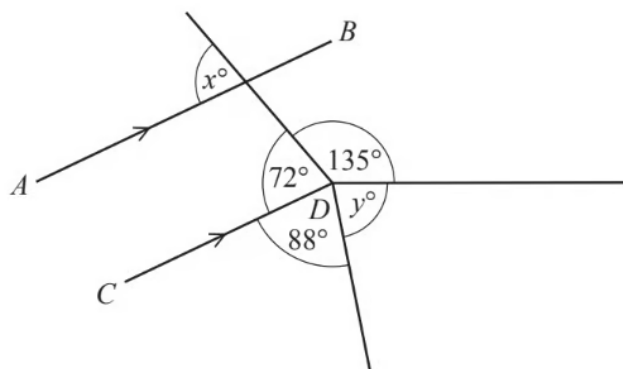
$b = \dots\dots\dots$ because $\dots\dots\dots$ [2]

iii) Find the value of c .

$c = \dots\dots\dots$ [2]

(6 marks)

11 (a)



NOT TO
SCALE

In the diagram, AB is parallel to CD .

Find the value of x .

Give a geometrical reason for your answer.

$x = \dots\dots\dots$ because $\dots\dots\dots$

(2 marks)

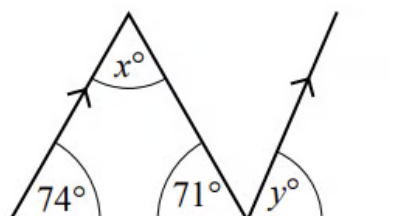
(b) Work out the value of y .

Give a geometrical reason for your answer.

$y = \dots\dots\dots$ because $\dots\dots\dots$

(2 marks)

12



NOT TO
SCALE

Work out the value of

i) x ,

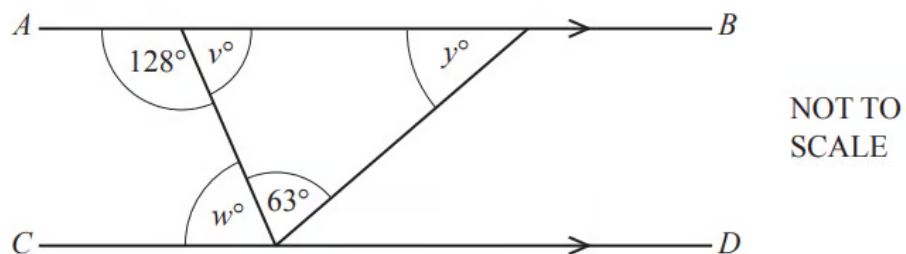
$x = \dots\dots\dots [1]$

ii) y .

$y = \dots\dots\dots [1]$

(2 marks)

13 The diagram shows a triangle between two parallel lines, AB and CD .



Find the value of

i) v ,

$v = \dots\dots\dots [1]$

ii) w ,

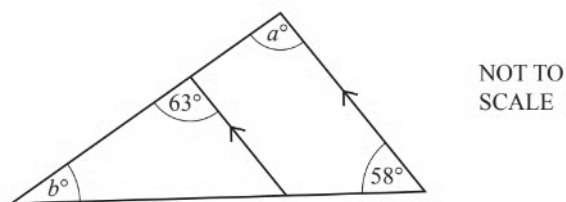
$w = \dots\dots\dots [1]$

iii) y .

$y = \dots\dots\dots [1]$

(3 marks)

14



Complete the statements.

$a = \dots\dots\dots$ because $\dots\dots\dots$

$b = \dots\dots\dots$ because $\dots\dots\dots$

(4 marks)

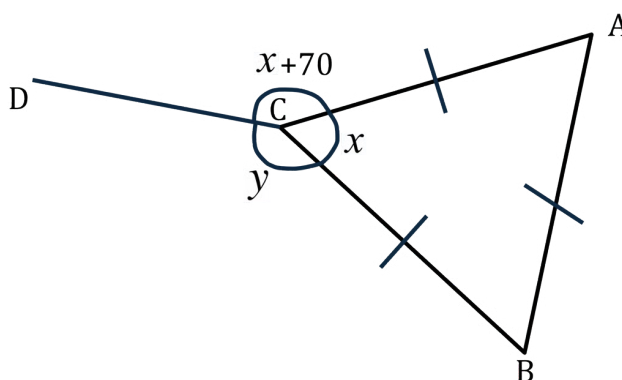
15 (a) The diagram shows an equilateral triangle ABC and straight line ABD .

$$AB = AC = BC$$

$$ACB = x$$

$$ACD = x + 70^\circ$$

$$BCD = y$$



Find the value of x

(1 mark)

(b) Find the value of y

(3 marks)

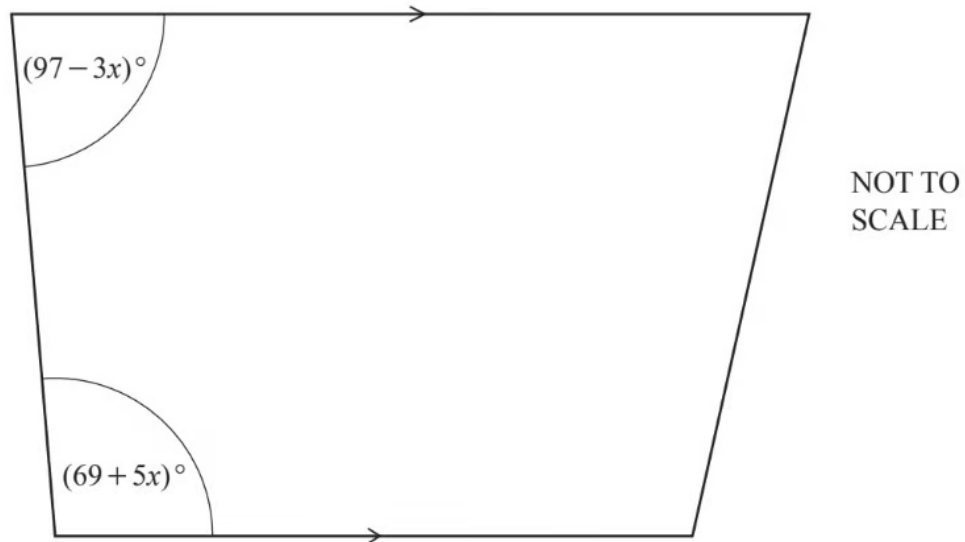
16 Each exterior angle of a regular polygon is 12° .

Work out the number of sides of the polygon.

(2 marks)

Hard Questions

- 1 The diagram shows a trapezium.



Work out the value of x .

$x = \dots\dots\dots$

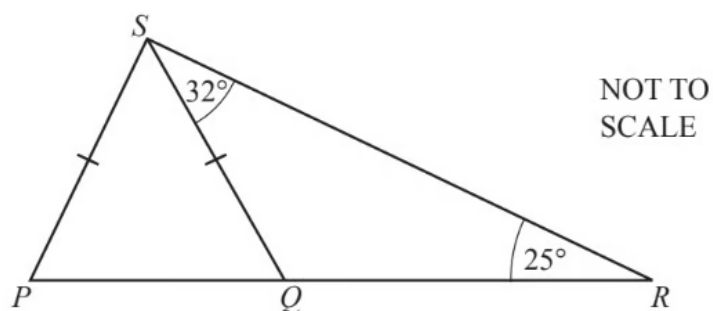
(3 marks)

- 2 Kim knows that one angle of an isosceles triangle is 48° .
He says that one of the other angles **must** be 66° .

Explain why Kim is wrong.

(2 marks)

3



The diagram shows triangle PRS and a straight line QS . Q is a point on PR . Angle $QRS = 25^\circ$, angle $RSQ = 32^\circ$ and $PS = QS$.

i) Find angle PQS .

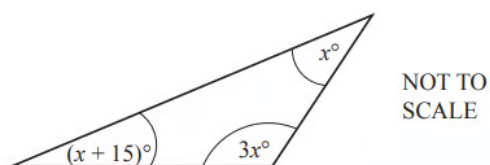
Angle $PQS = \dots\dots\dots$ [2]

ii) Find angle PSR .

Angle $PSR = \dots\dots\dots$ [2]

(4 marks)

4 The diagram shows a triangle.

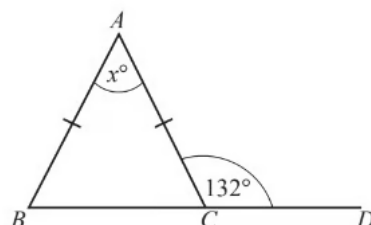


Use the diagram to write down an equation and solve it to find the value of x .

$x = \dots\dots\dots$ [4]

(4 marks)

5



NOT TO
SCALE

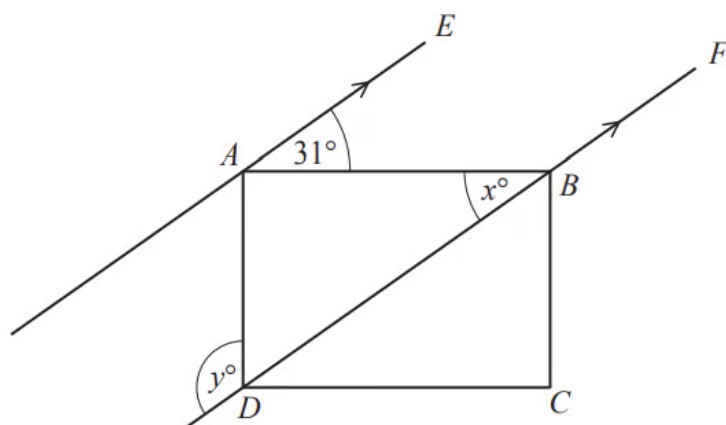
The diagram shows an isosceles triangle, ABC .
 BCD is a straight line.

Find the value of x .

$x = \dots\dots\dots$ [2]

(2 marks)

6



NOT TO
SCALE

$ABCD$ is a rectangle.
 AE is parallel to DBF .

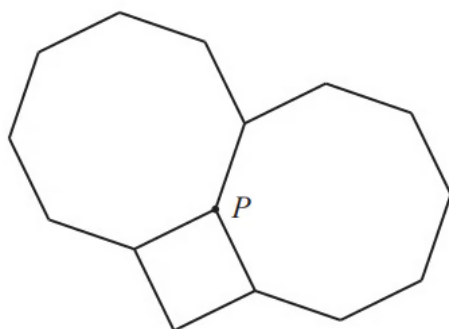
Find the value of x and the value of y .

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(2 marks)

7

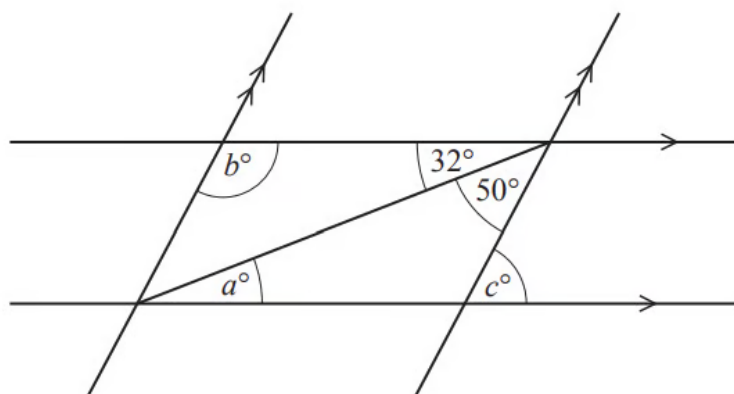


NOT TO
SCALE

Two regular octagons and a square meet at point P .
Show, by calculation, that the three interior angles at P add up to 360° .

(3 marks)

8

NOT TO
SCALE

The diagram shows two pairs of parallel lines.

Find the value of a , the value of b and the value of c .

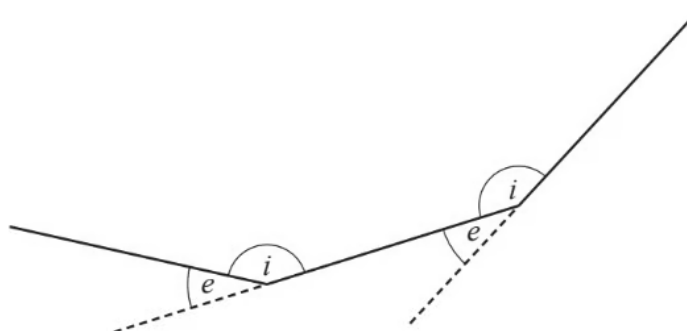
$a =$

$b =$

$c =$

(3 marks)

9 The diagram shows part of a different regular polygon.

NOT TO
SCALE

e is an exterior angle.

i is an interior angle.

The ratio $e : i = 2 : 13$.

i) Work out angle e .

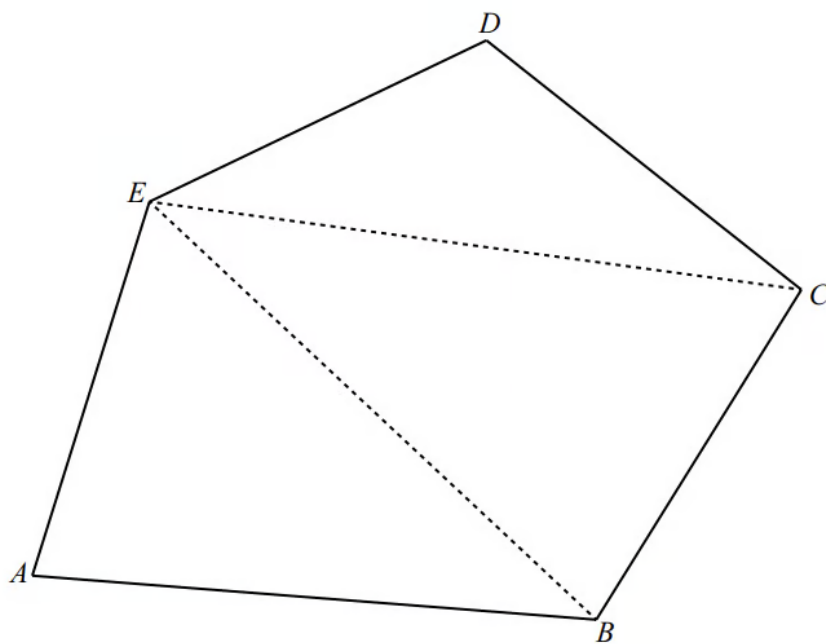
[3]

ii) Work out the number of sides of this regular polygon.

[1]

(4 marks)

10

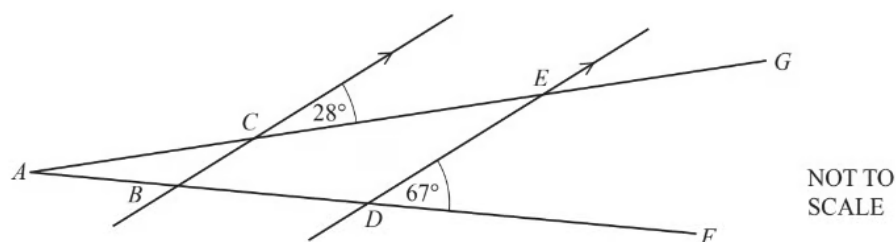


$ABCDE$ is a pentagon.

Explain why the diagram shows that the sum of the interior angles of a pentagon is 540° .
Do not measure any angles.

(1 mark)

11



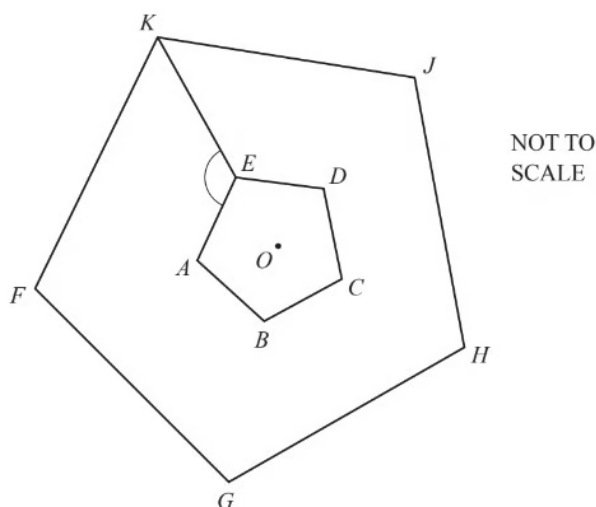
In the diagram AG and AF are straight lines.
Lines BC and DE are parallel.

Find angle CED and give a reason for your answer.

Angle CED = because

(2 marks)

12



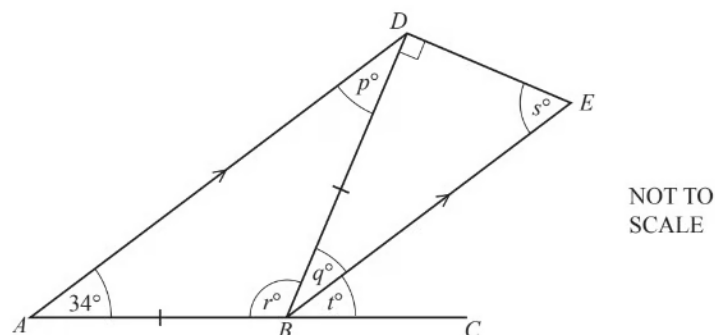
The diagram shows two regular pentagons.
Pentagon $FGHIK$ is an enlargement of pentagon $ABCDE$, centre O .

Find angle AEK .

Angle AEK =

(4 marks)

13



In the diagram, ABC is a straight line. AD is parallel to BE , angle $BAD = 34^\circ$ and $AB = BD$.

i) Complete the statements.

a) $p = \dots\dots\dots$ because $\dots\dots\dots$

[2]

b) $q = \dots\dots\dots$ because $\dots\dots\dots$

[2]

ii) Work out the value of r and the value of s .

$r = \dots\dots\dots$
 $s = \dots\dots\dots$ [2]

iii) Find the value of t and give a reason for your answer.

$t = \dots\dots\dots$ because $\dots\dots\dots$

[2]

(8 marks)

14 Each interior angle of a regular polygon is 162° .

Calculate the number of sides of the polygon.

(3 marks)