

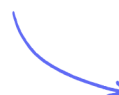
Non-Calculator Questions

Angles in Polygons & Parallel Lines

Basic Angle Properties / Angles in Polygons / Angles in Parallel Lines

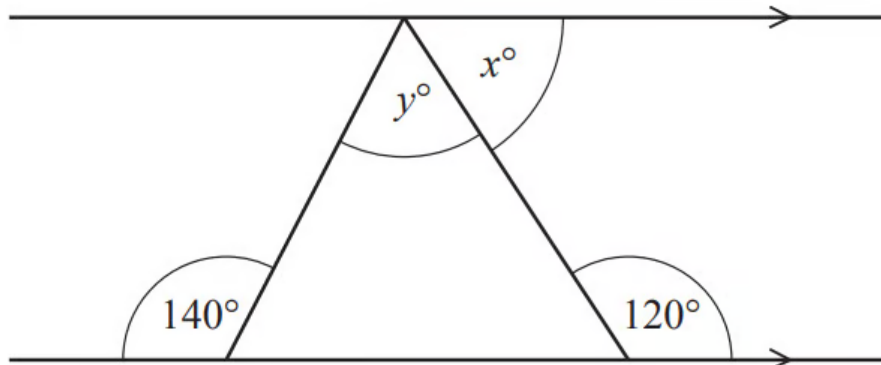
Easy (3 questions)	/7
Medium (9 questions)	/24
Hard (6 questions)	/18
Very Hard (3 questions)	/13
Total Marks	/62

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Easy Questions

1



NOT TO
SCALE

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

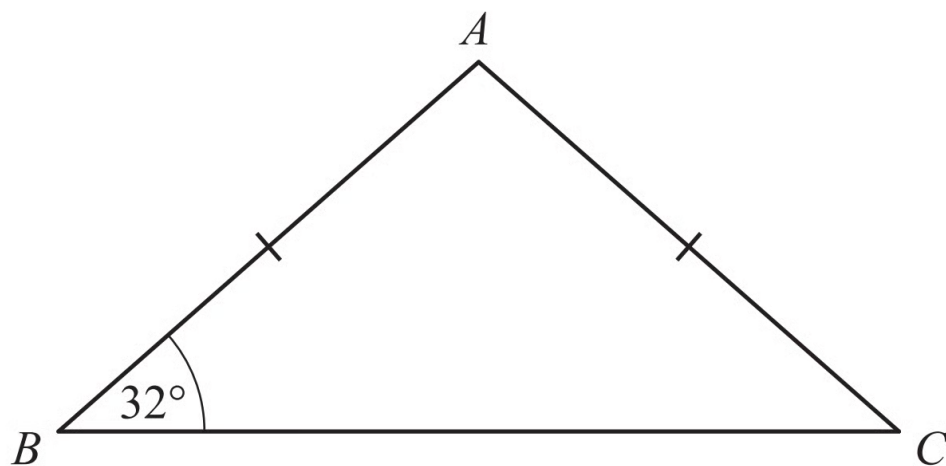
Find the value of x and the value of y .

$x =$

$y =$

(3 marks)

2

NOT TO
SCALE

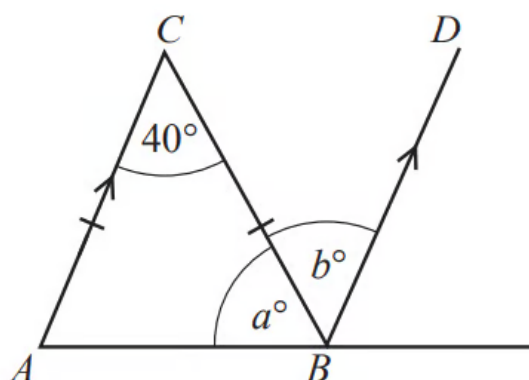
Triangle ABC is isosceles.
Angle $ABC = 32^\circ$ and $AB = AC$.

Find angle BAC .

Angle $BAC = \dots\dots\dots$

(2 marks)

3

NOT TO
SCALE

Triangle ABC is isosceles.
 AC is parallel to BD .

Find the value of a and the value of b .

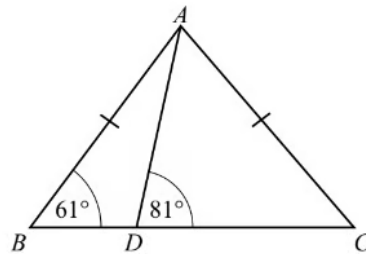
$a = \dots\dots\dots$

$b = \dots\dots\dots$

(2 marks)

Medium Questions

- 1 The diagram shows two triangles, ABD and ADC .



NOT TO
SCALE

BDC is a straight line, $AB = AC$, angle $ABD = 61^\circ$ and angle $ADC = 81^\circ$. Work out angle DAC .

Angle $DAC = \dots\dots\dots$

(2 marks)

- 2 Find the number of sides of a regular polygon with interior angle 162° .

(2 marks)

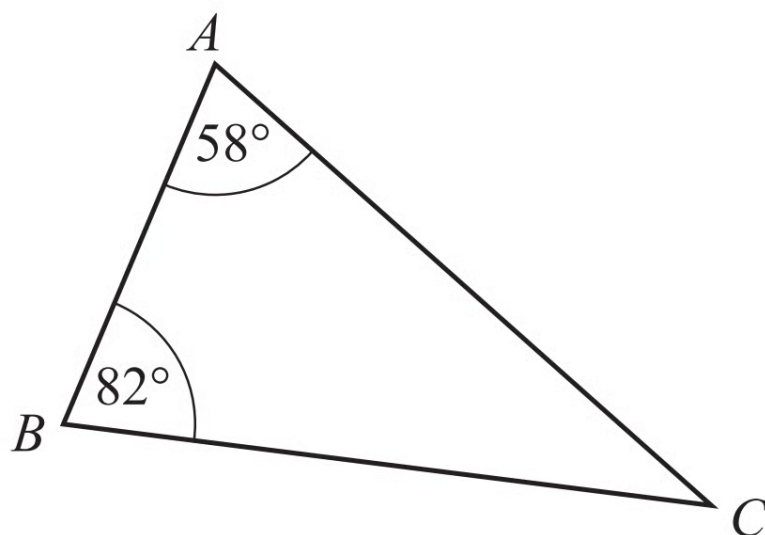
- 3 The interior angle of a regular polygon with n sides is 156° .

Work out the value of n .

$n = \dots\dots\dots$

(2 marks)

4 (a)



NOT TO
SCALE

The diagram shows triangle ABC .

The triangle is reflected in the line BC to give a quadrilateral $ABDC$.

Write down the mathematical name of the quadrilateral $ABDC$.

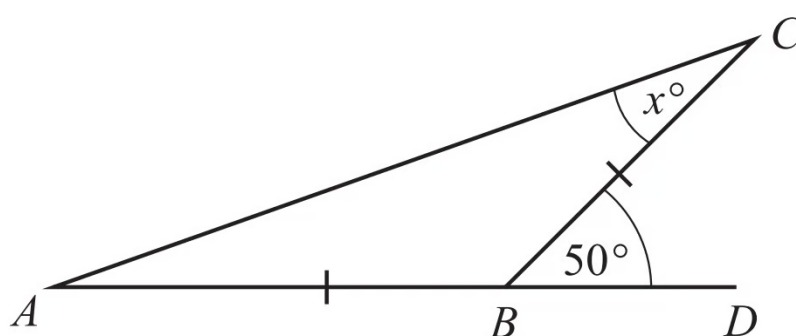
(1 mark)

(b) Find angle ACD .

Angle $ACD = \dots\dots\dots$

(2 marks)

5



NOT TO
SCALE

$AB = BC$ and ABD is a straight line.

Find the value of x .

$x = \dots\dots\dots$

(2 marks)

- 6 A regular polygon has an interior angle of 176° .

Find the number of sides of this polygon.

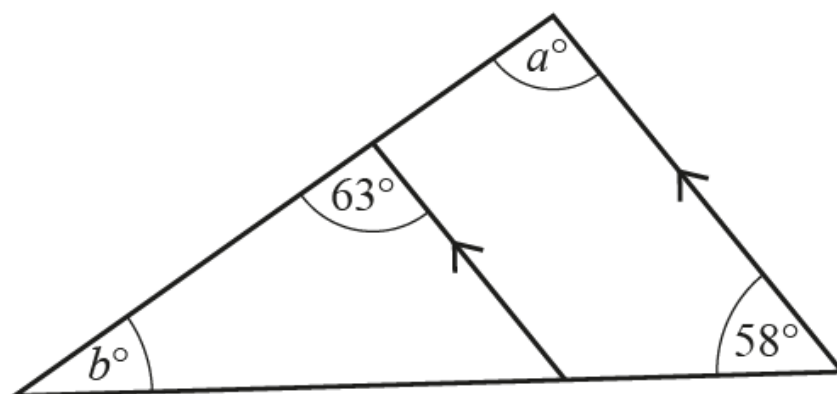
(3 marks)

- 7 The exterior angle of a regular polygon is x° and the interior angle is $8x^\circ$.

Calculate the number of sides of the polygon.

(3 marks)

8



NOT TO
SCALE

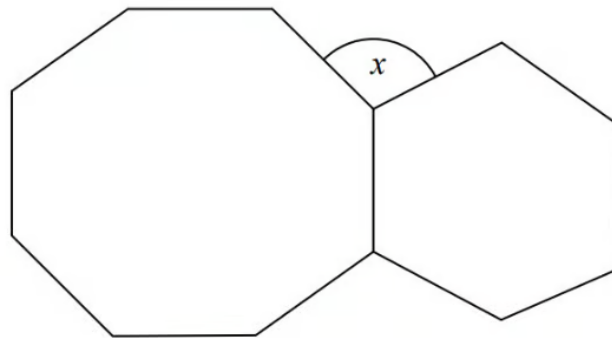
Complete the statements.

a = because

b = because

(4 marks)

9



The diagram shows a regular octagon and a regular hexagon.

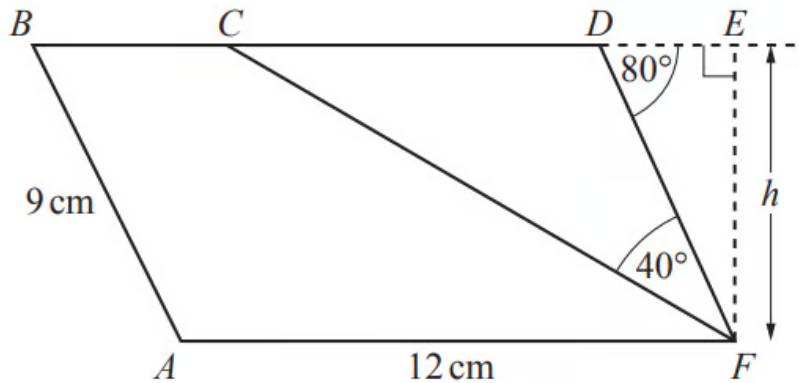
Find the size of the angle marked x .

You must show all your working.

(3 marks)

Hard Questions

1

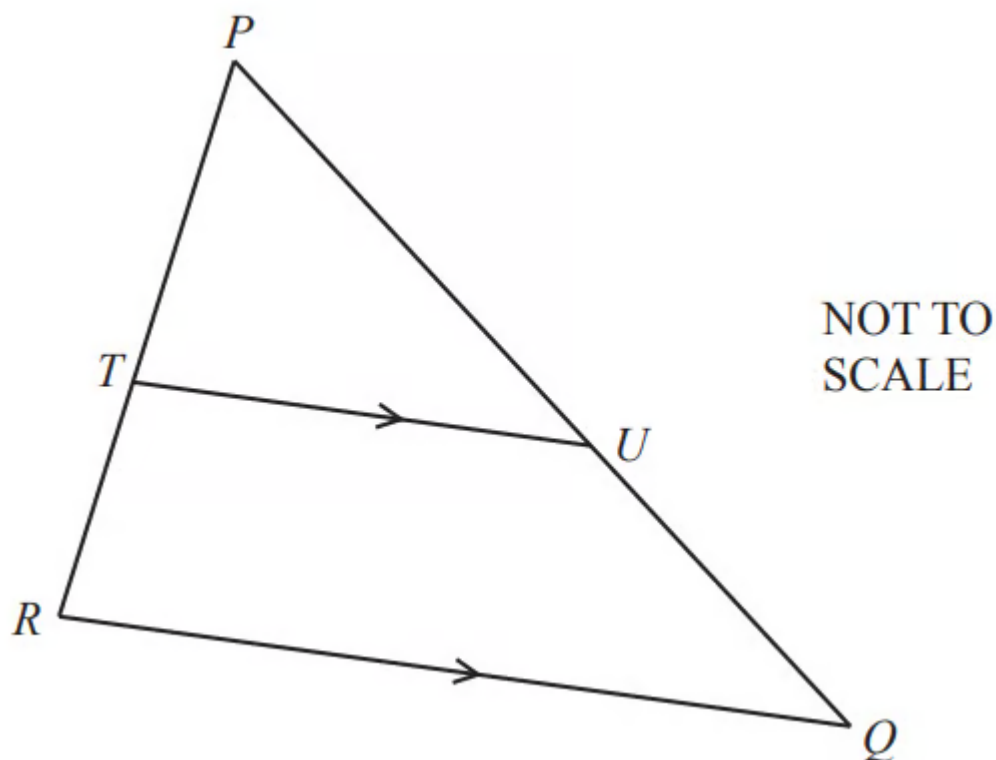


$ABDF$ is a parallelogram and $BCDE$ is a straight line.
 $AF = 12\text{ cm}$, $AB = 9\text{ cm}$, angle $CFD = 40^\circ$ and angle $FDE = 80^\circ$.

Explain why triangle CDF is isosceles.

(2 marks)

2



PQR is a triangle.

T is a point on PR and U is a point on PQ .

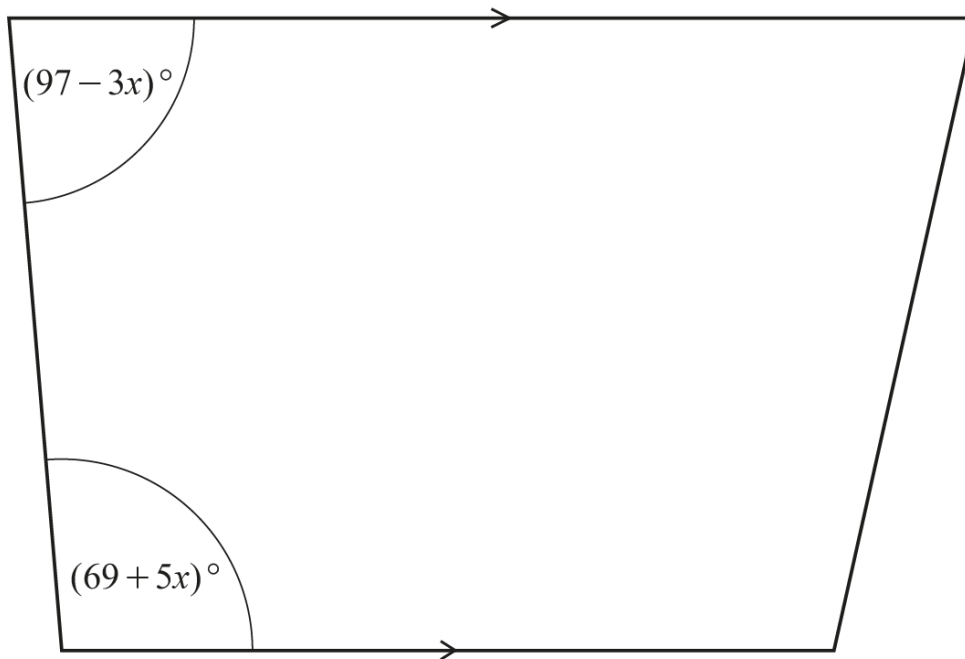
RQ is parallel to TU .

Explain why triangle PQR is similar to triangle PUT .

Give a reason for each statement you make.

(3 marks)

- 3 The diagram shows a trapezium.



NOT TO
SCALE

Work out the value of x .

$x =$

(3 marks)

- 4 A hexagon has five angles that each measure 115° .

Calculate the size of the sixth angle.

(3 marks)

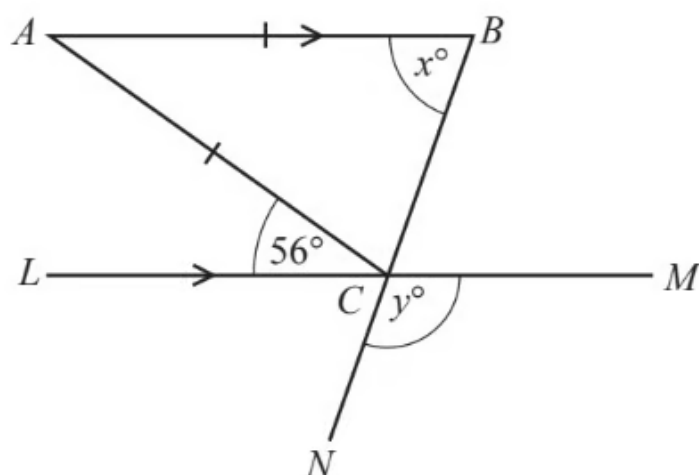
- 5 The angles of a quadrilateral are x° , $(x + 5)^\circ$, $(2x - 25)^\circ$ and $(x + 10)^\circ$.

Find the value of x .

$x = \dots\dots\dots$

(3 marks)

6



NOT TO
SCALE

The diagram shows an isosceles triangle ABC with $AB = AC$.
 LCM and BCN are straight lines and LCM is parallel to AB .
Angle $ACL = 56^\circ$.

Find the value of x and the value of y .

$x = \dots\dots\dots$

$y = \dots\dots\dots$

(4 marks)

Very Hard Questions

1

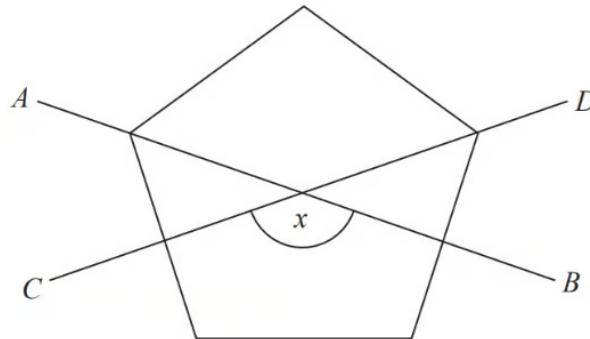


Diagram **NOT**
accurately drawn

The diagram shows a regular pentagon.
 AB and CD are two of the lines of symmetry of the pentagon.

Work out the size of the angle marked x .
You must show all your working.

(4 marks)

2 $ABCDEFGHI$ is a regular 9-sided polygon.

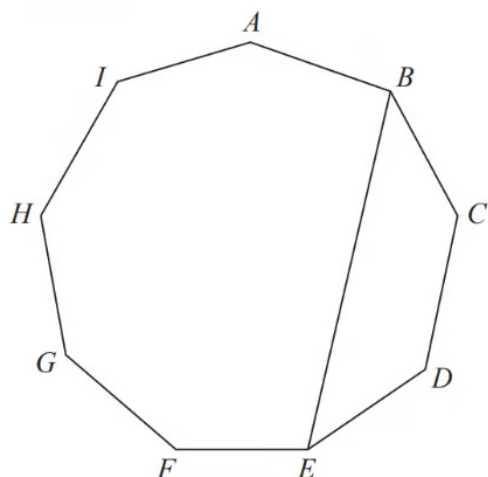


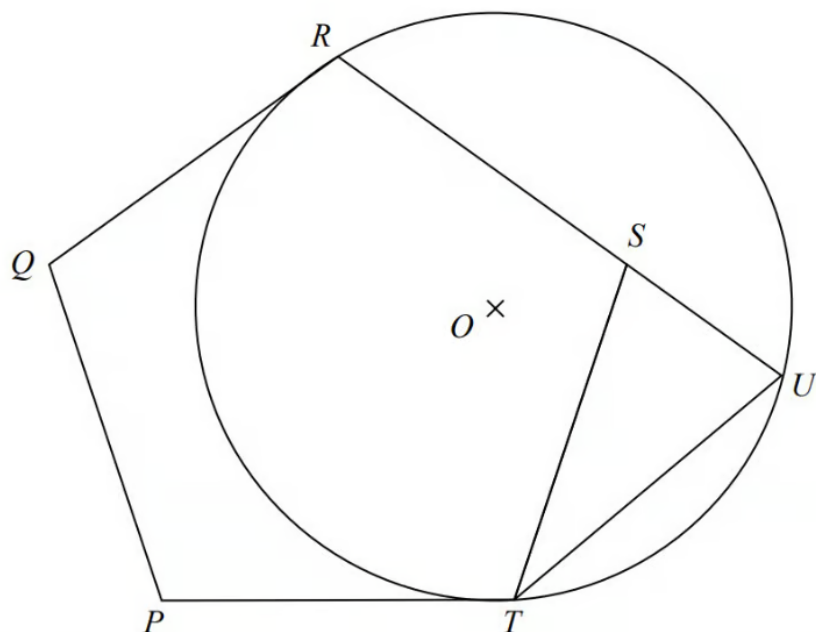
Diagram **NOT**
accurately drawn

The vertices B and E are joined with a straight line.

Work out the size of angle BEF .

You must show how you get your answer.

(4 marks)



$PQRST$ is a regular pentagon.
 R , U and T are points on a circle, centre O .
 QR and PT are tangents to the circle.
 RSU is a straight line.

Prove that $ST = UT$.

(5 marks)