Write your name, centre number and candidate number in the boxes below.

Surname	Other names

Centre number | | | | | |

Candidate number | | | | |

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Angles in polygons

Time allowed: 35 minutes

Subject code **0580**

Mathematics

Questions from Paper 1 and Paper 2

You must have: a ruler marked in centimetres and millimetres, a protractor, compasses, a pen, an HB pencil and an eraser.
You may use a calculator.

Total marks

/ 28

Instructions

- Answer every question in the space provided on this paper.
- Write in black or dark blue ink. Pencil may be used for diagrams and graphs.
- Fill in your name, centre number and candidate number above.
- Show your working: a correct method can earn marks even if the answer is wrong.
- Unless a question says otherwise, give answers that are not exact to 3 significant figures, and angles in degrees to 1 decimal place.

Information

- This paper has 10 questions worth 28 marks in total.
- The marks for each question or part are shown in brackets, for example [3].

Advice

- Read every question through once before you write anything.
- Use the marks in brackets to judge how long to spend on each part.
- If you finish early, go back and check your working.

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Turn over ►

Print at 100% (Actual size) so diagrams keep their real measurements.

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

Work out the number of sides of this polygon.

..... [1]

Angles in polygons Click for more variations

1	18	**1**	

2 Calculate the size of one exterior angle of a regular 15-sided polygon.

..... [2]

Angles in polygons Click for more variations

2	24 nfww	**2**	**M1** for 360 ÷ 15 If zero scored, **SC1** for answer of 156

3 Calculate the size of one interior angle of a regular octagon.

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..... [2]

Angles in polygons Click for more variations

3	135	**2**	**M1** for $180 - (360 \div 8)$ oe or $\frac{(8-2) \times 180}{8}$ oe

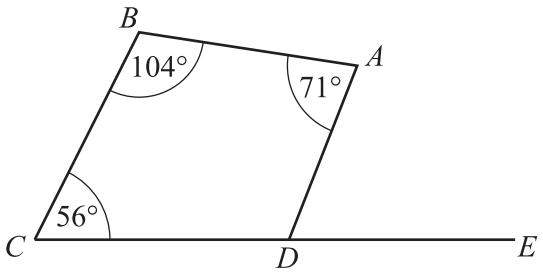
4 Find the number of sides of a regular polygon with interior angle 160°.

..... [2]

Angles in polygons Click for more variations

4	18	**2**	**M1** for $\frac{360}{180-160}$ or for $\frac{180(n-2)}{n} = 160$

5



NOT TO SCALE

CDE is a straight line.

Find angle *ADE*.

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..... [2]

Angles in polygons Click for more variations

5	51	**2**	**M1** for $360 - (56 + 104 + 71)$

6 The interior angles of a pentagon are in the ratio $4 : 5 : 5 : 7 : 9$.

Find the size of the largest angle.

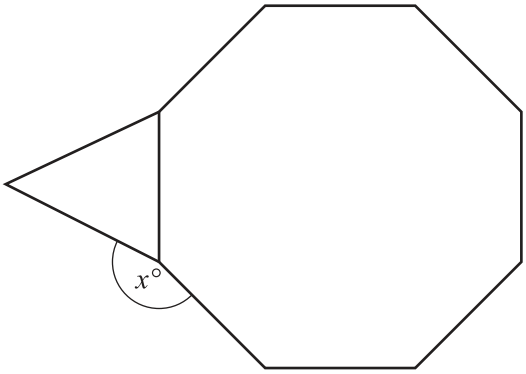
..... [3]

Angles in polygons Click for more variations

6	162	**3**	**M2** for $\left(\frac{(5-2)\times 180}{4+5+5+7+9}\right) \times k$ where $k = 1, 4, 5, 7, 9$ or **M1** for $180n \div (4 + 5 + 5 + 7 + 9)$ where $n \geqslant 2$ or for $(5 - 2) \times 180$ oe

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



NOT TO SCALE

Work out the value of x.

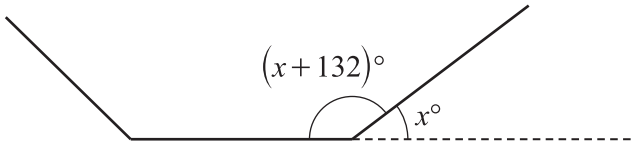
$x =$ ..... [3]

Angles in polygons Click for more variations

7	165	**3**	**M2** for $\frac{360}{8} + \frac{360}{3}$ oe or **M1** for **[**exterior angle of octagon =] $\frac{360}{8}$ or [exterior angle of triangle =] $\frac{360}{3}$ oe

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8



NOT TO SCALE

The diagram shows part of a regular polygon.
The interior angle of the polygon is 132° larger than the exterior angle.

Calculate the number of sides of this polygon.

..... [3]

Angles in polygons Click for more variations

8	15	**3**	**B2** for [x =] 24 OR **M1** for $x + x + 132 = 180$ oe soi **M1** for $\frac{360}{\textit{their } x}$ oe provided this gives an integer answer

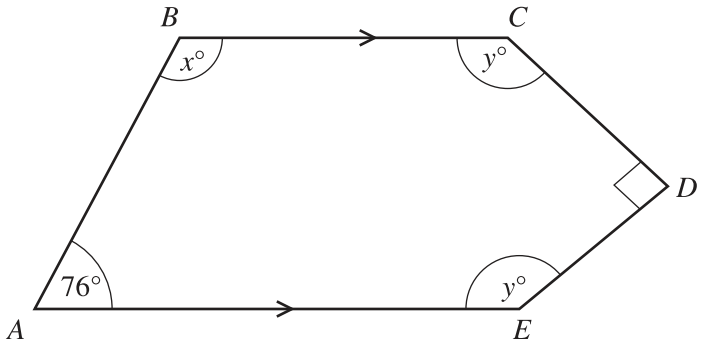
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9 **(a)** Show that the sum of the interior angles of a regular pentagon is 540°.

Answer(a)

[2]

(b)



NOT TO SCALE

The diagram shows a pentagon *ABCDE*.
BC is parallel to *AE* and angle *CDE* is a right angle.

Find the values of x and y.

Answer(b) $x =$ .....

$y =$ ..... [3]

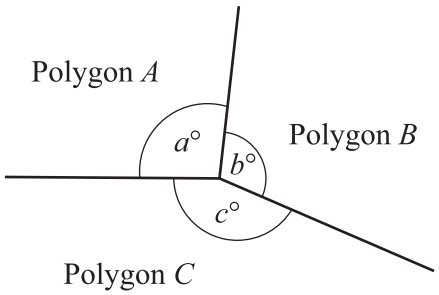
(a) Angles in polygons (b) Angles in polygons Click for more variations

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9 (a)	Exterior angle method [Ext angle =] $360 \div 5$ $5 \times (180 - 72) = 540$	**M1** **E1dep**	
	Formula method $(n-2) \times 180$ or $\frac{(n-2)\times 180}{n}$ $(5-2) \times 180 = 540$ **or** $\frac{(5-2)\times 180}{5} = 108$ **and** $5 \times 108 = 540$	**M1** **E1dep**	
	Triangle methods Explanation or sketch to split pentagon into 3 or 5 triangles. $3 \times 180 = 540$ or $5 \times 180 - 360 = 540$	**M1** **E1dep**	
(b)	[x =] 104 [y =] 135	**3ft**	B1 [x =] 104 M1 for $540 - (90 + 76 +$ their x)

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10



NOT TO SCALE

Three regular polygons A, B and C meet at a point.
The interior angles of the polygons are in the ratio $a : b : c = 3 : 4 : 5$.

Show that polygon C has twice the number of sides as polygon B.

[5]

Angles in polygons Click for more variations

10	Finds number of sides 6 and 12 with appropriate supporting working for each value.	**5**	**B2** for 120 and 150 or **M1** for $360 \div (3 + 4 + 5) \times k$ oe where $k = 1$, 3, 4 or 5 **M1** for $\frac{360}{180 - their120}$ or $\frac{180(n-2)}{n} = their120$ oe **M1** for $\frac{360}{180 - their150}$ or $\frac{180(n-2)}{n} = their150$ oe

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