I.G.C.S.E. Geometry

Index:

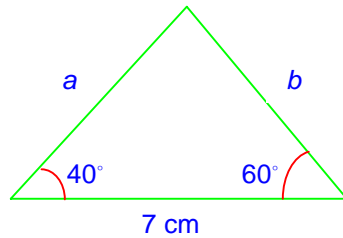Please click on the question number you want

You can access the solutions from the end of each question

Question 1
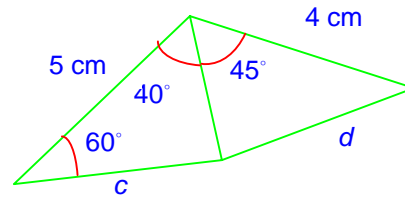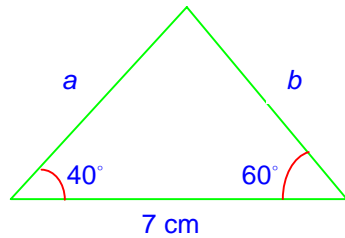
Use a ruler and a protractor only to draw a full size diagram and measure the sides marked with letters.
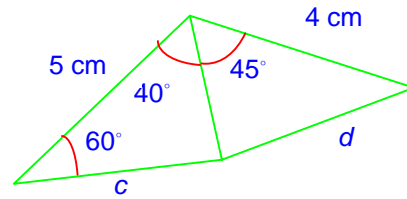
Solution to question 1

By drawing accurate diagrams using a protractor and ruler only and measuring the sides with a ruler we have

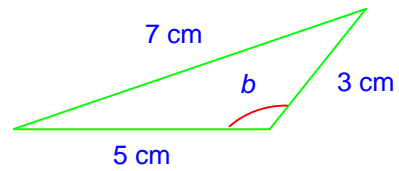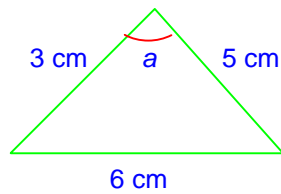$a = 6.2\,\text{cm}$
$b = 4.6\,\text{cm}$
$c = 3.3\,\text{cm}$
$d = 3.2\,\text{cm}$

Click here to read the question again
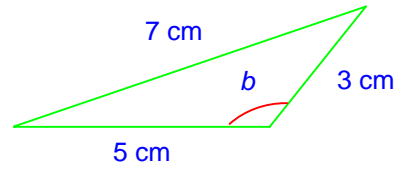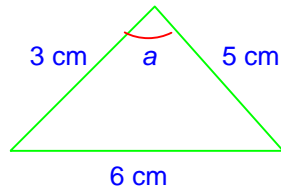
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Question 2

Construct the triangles below using a ruler and compass only and measure angles marked with letters.

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Solution to question 2

3 cm   *a*   5 cm

6 cm

7 cm   *b*   3 cm

5 cm

By drawing accurate diagrams using a compass and ruler only and measuring the angles with a protractor we have

$a = 94°$
$b = 120°$

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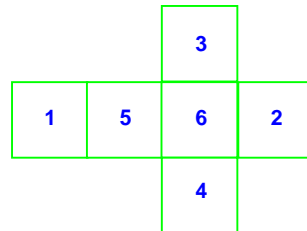*Click here to return to the index*

Question 3

Draw a net to make a cube and mark on where you would mark on the numbers to make a die.

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Solution to question 3

	3	
1	5	6	2
	4	

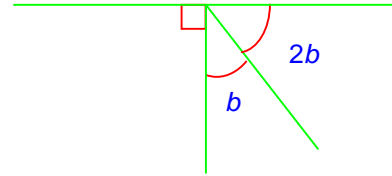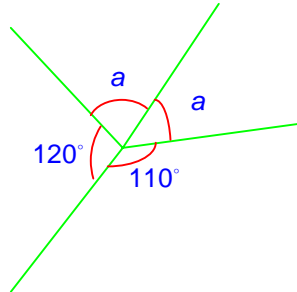There are other possibilities.

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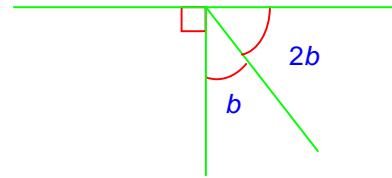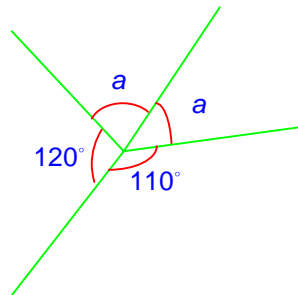
Question 4

Find the angles marked with letters

*Click **here** to read the solution to this question*

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Solution to question 4

Angles at a point add up to $360°$

$$120° + 110° + a + a = 360°$$
$$230° + 2a = 360°$$
$$2a = 360° - 230°$$
$$2a = 130°$$
$$a = \frac{130°}{2} = 65°$$

Angles on a straight line add up to $180°$

$$90° + b + 2b = 180°$$
$$90° + 3b = 180°$$
$$3b = 180° - 90°$$
$$3b = 90°$$
$$b = \frac{90°}{3} = 30°$$

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Question 5

Find the angles marked with letters
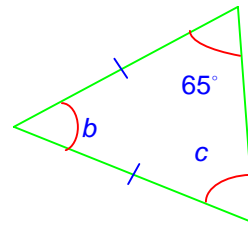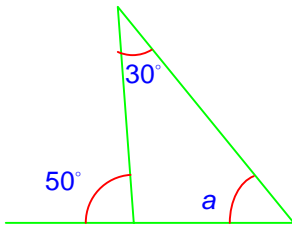
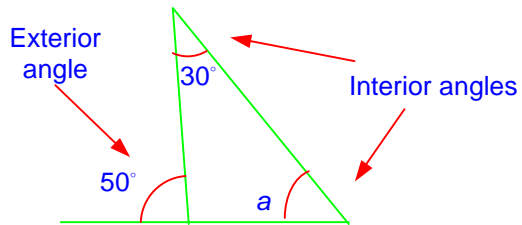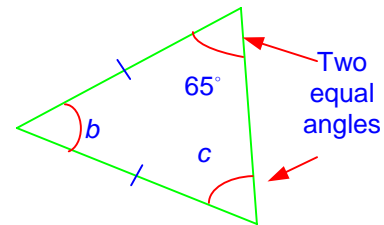*Click here to read the solution to this question*

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Solution to question 5

The exterior angle of a triangle is equal to the sum of the two opposite interior angles

$$a + 30° = 50°$$
$$a = 50° - 30° = 20°$$

The triangle is isosceles and therefore has two equal sides and angles.

$$c = 65° \text{ equal base angles.}$$

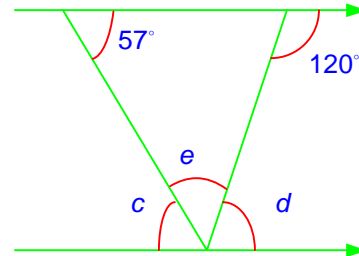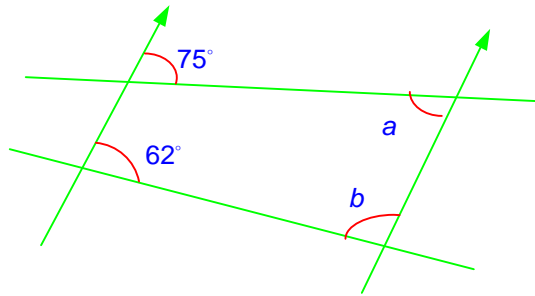Angles in a triangle add up to $180°$

$$b + 65° + 65° = 180°$$
$$b + 130° = 180°$$
$$b = 180° - 130° = 50°$$

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Question 6

1. Find the angles marked with letters.

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Solution to question 6

$a = 75°$ (alternate angles).

$62° + b = 180°$ (allied angles)

$\quad b = 180° - 62° = 118°$

$c = 57°$ (alternate angles).

$120° + d = 180°$ (allied angles)

$\quad d = 180° - 120° = 60°$

$\quad\quad c + d + e = 180°$ (angles on a

$57° + 60° + e = 180°$ straight line)

$\quad\quad 117° + e = 180°$
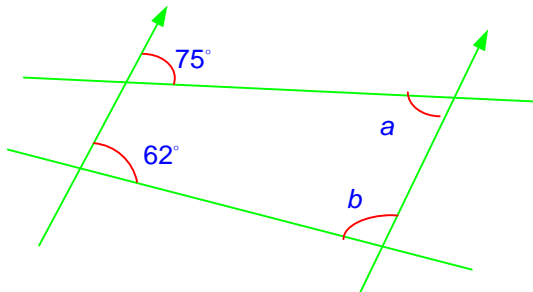
$\quad\quad\quad e = 180° - 117° = 63°$

Question 7

Find the angles marked with letters.
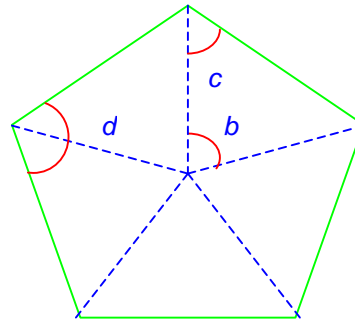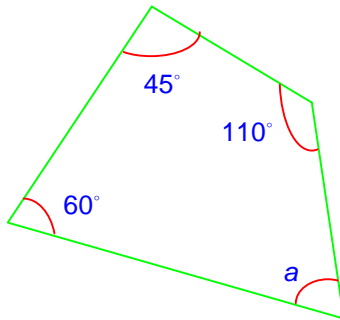
Click here to read the solution to this question

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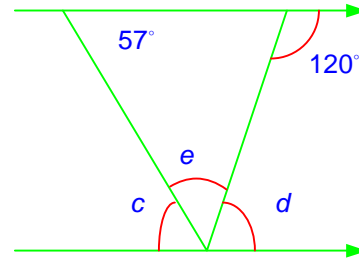
Solution to question 7

Quadrilateral

Regular Pentagon

Angles in a quadrilateral add up to $360°$

$$60° + 45° + 110° + a = 360°$$
$$215° + a = 360°$$
$$a = 360° - 215° = 145°$$

Angles at a point add up to $360°$

$$b = \frac{360°}{5} = 72°$$

Triangle AOB is isosceles hence

$$b + c + c = 180°$$
$$72° + 2c = 180°$$
$$2c = 180° - 72°$$
$$c = \frac{108°}{2} = 54°$$

$$d = 2c$$
$$= 2 \times 54°$$
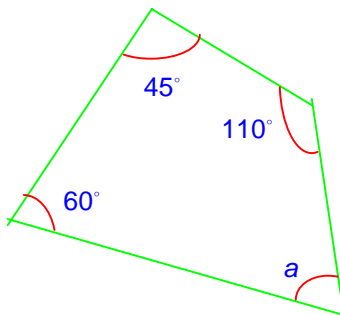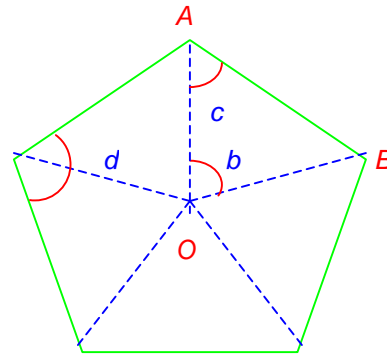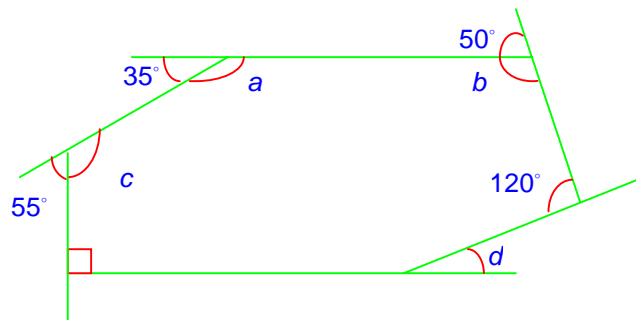$$= 108°$$

Click here to read the question again

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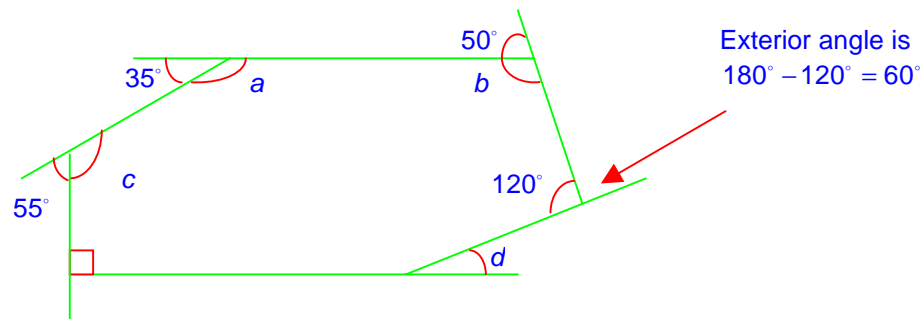
Question 8

Find the angles marked in the diagram

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Solution to question 8

$a + 35° = 180°$

$a = 180° - 35° = 145°$

$b + 50° = 180°$

$b = 180° - 50° = 130°$

$c + 55° = 180°$

$c = 180° - 55° = 125°$

$90° + 55° + 35° + 50° + 60° + d = 360°$

$290° + d = 360°$

$d = 360° - 290° = 70°$

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Question 9

Each exterior angle of a regular polygon is $30°$.
Find:

a.   the number of sides of the polygon;

b.   the size of each interior angle.

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Solution to question 9

a. The sum of the exterior angles of any polygon is $360°$.

Number of sides $= \dfrac{360°}{30°} = 12$ sides

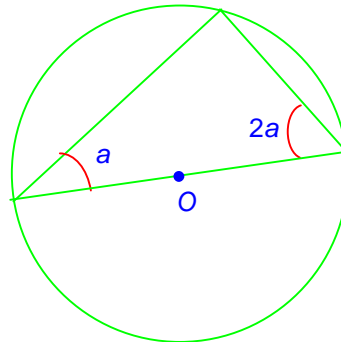**b.** The sum of the exterior and interior angle of any polygon is $180°$

$$e + i = 180°$$
$$30° + i = 180°$$
$$i = 180° - 30° = 150°$$

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Question 10
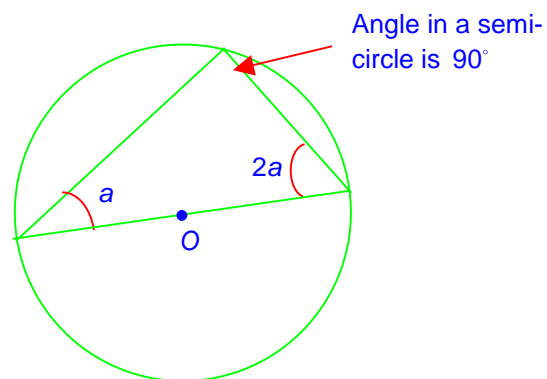
Find the value of the angle a.

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Solution to question 10

Angle in a semi-circle is $90°$

The angle a semi-circle is a right angle.

Therefore $a + 2a = 90°$

$$3a = 90°$$

$$a = \frac{90°}{3} = 30°$$

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