

Lesson 10

GCSE Mathematics Angles & Polygons

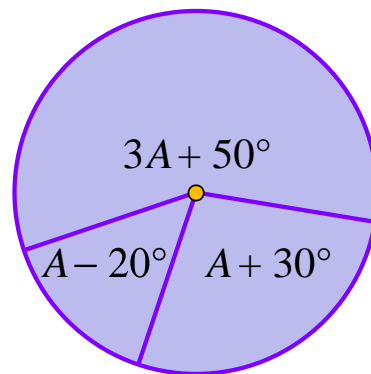
10.1 The Angle Ability Challenges

A type of angle algebra problem, not yet covered, is one in which the angles are expressed in terms of expressions involving not just multiplication, but addition and subtraction as well.

Example

About the centre of a circle are angles of $(3A + 50)$, $(A + 30)$ and $(A - 20)$. Determine the value of A and list the three angles at the centre of the circle.

The angles in the diagram are intentionally not accurately drawn.



Teaching Video: <http://www.NumberWonder.co.uk/v9034/10.mp4>



[4 marks]

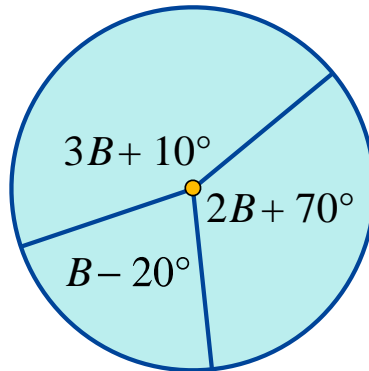


10.2 Exercise

You may use a calculator
Marks Available : 50

Question 1

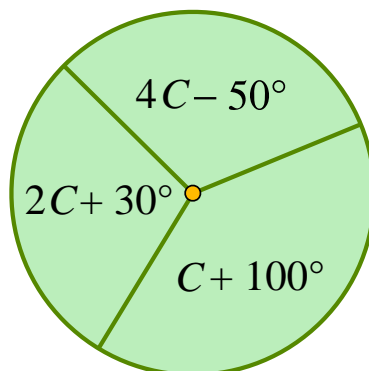
About the centre of a circle are angles of $(3B + 10)$, $(2B + 70)$ and $(B - 20)$
Determine the value of B and list the three angles at the centre of the circle.
The angles in the diagram are intentionally not accurately drawn.



[4 marks]

Question 2

About the centre of a circle are angles of $(4C - 50)$, $(C + 100)$ and $(2C + 30)$
Determine the value of C and list the three angles at the centre of the circle.
The angles in the diagram are intentionally not accurately drawn.



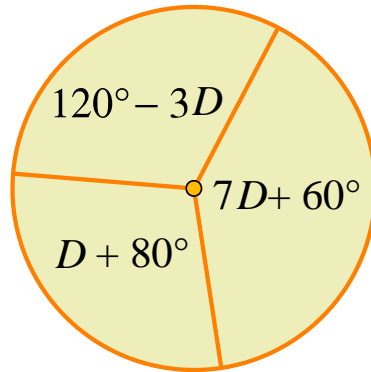
[4 marks]

Question 3

About the centre of a circle are angles of $(120 - 3D)$, $(7D + 60)$ and $(D + 80)$

Determine the value of D and list the three angles at the centre of the circle.

The angles in the diagram are intentionally not accurately drawn.



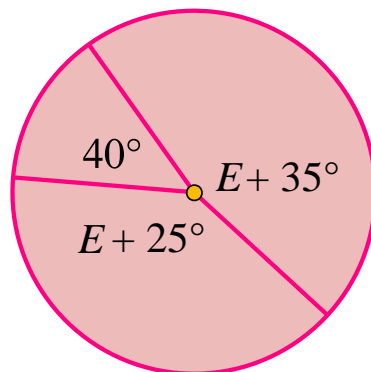
[4 marks]

Question 4

About the centre of a circle are angles of (40) , $(E + 35)$ and $(E + 25)$

Determine the value of E and list the three angles at the centre of the circle.

The angles in the diagram are intentionally not accurately drawn.



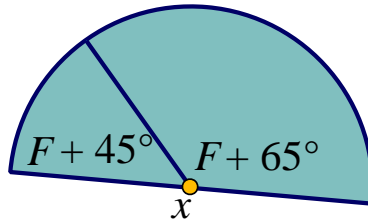
[4 marks]

Question 5

About the point x of the semi-circle are angles of $(2F + 45)$ and $(3F + 65)$

Determine the value of F and list the two angles.

The angles in the diagram are intentionally not accurately drawn.



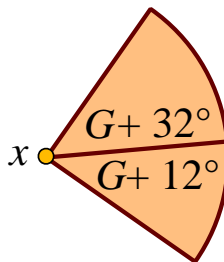
[4 marks]

Question 6

About the point x of the quarter-circle are angles of $(G + 32)$ and $(G + 12)$

Determine the value of G and list the two angles.

The angles in the diagram are intentionally not accurately drawn.



[4 marks]

Question 7

For a regular polygon, use the fact that;

$$\text{Number Of Sides} = \frac{360}{\text{Exterior Angle}}$$

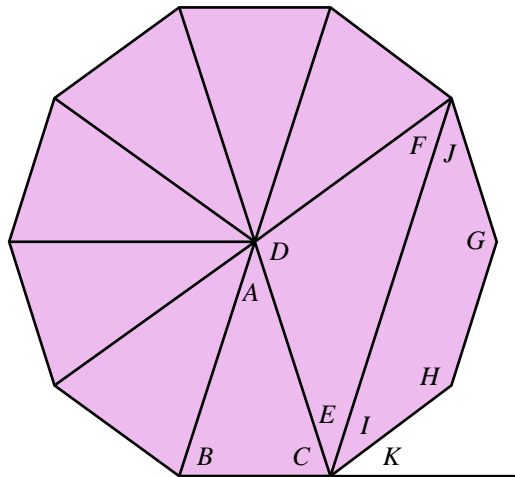
to work out how many sides a polygon has if the exterior angle is;

- (i) 60° (ii) 36° (iii) 72°

Also, name each of these three polygons.

[6 marks]

Question 8



- (a) How many sides has a decagon ?

[1 mark]

- (b) Determine the size of the following angles;

- | | | | |
|---------|-----|----------|-----|
| (i) | A | (vii) | G |
| (ii) | B | (viii) | H |
| (iii) | C | (ix) | I |
| (iv) | D | (x) | J |
| (v) | E | (xi) | K |
| (vi) | F | | |

[11 marks]

Question 9

For a regular polygon, use the fact that;

$$\text{Exterior Angle} = \frac{360}{\text{Number Of Sides}}$$

to work out the exterior angle of a regular polygon with the following number of sides;

(i) 3

(ii) 7

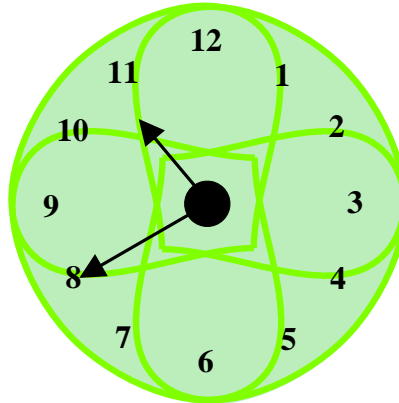
(iii) 15

[3 marks]

Question 10

What is the acute angle between the hands of a clock at “Twenty to eleven” ?

Show your working.



[5 marks]