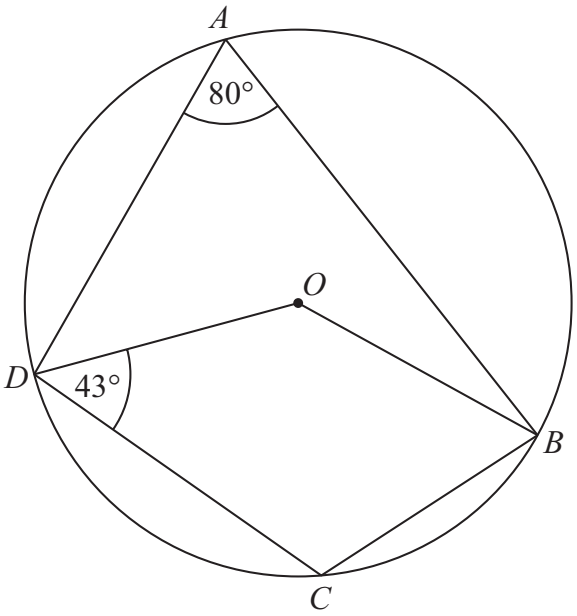
Cyclic Quadrilaterals and Radii

I Do

A, B, C and D are points on a circle with centre O.



Find the size of angle OBC.
Write down any circle theorems that you use.

(Total for Question 20 is 4 marks)

Cyclic Quadrilaterals and Radii

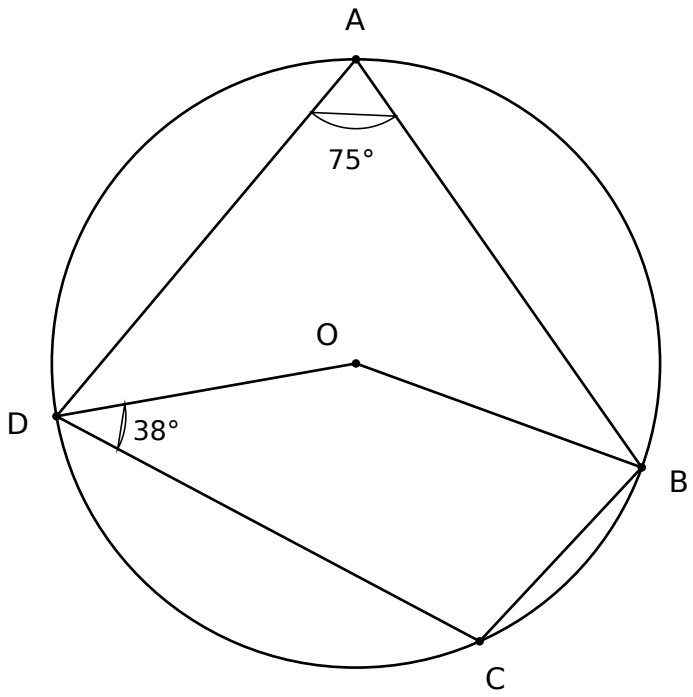
We Do

A, B, C and D are points on a circle with centre O.

Angle DAB = 75° and angle CDO = 38°.

Find the size of angle OBC. Give a reason for each stage of your working.

Not accurately drawn



Show all your working and give reasons.

(Total: 4 marks)

Cyclic Quadrilaterals and Radii

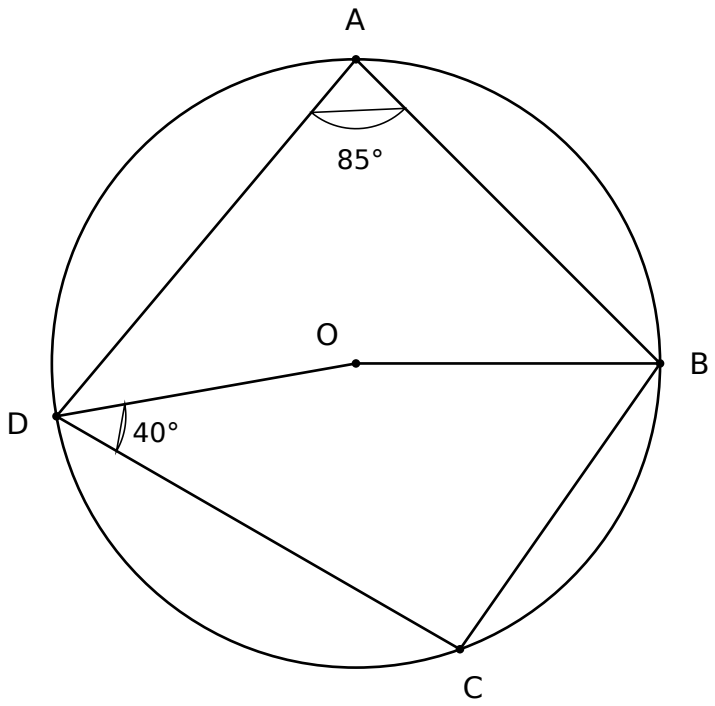
You Do 1

A, B, C and D are points on a circle with centre O.

Angle DAB = 85° and angle CDO = 40°.

Find the size of angle OBC. Give a reason for each stage of your working.

Not accurately drawn



Show all your working and give reasons.

(Total: 4 marks)

Cyclic Quadrilaterals and Radii

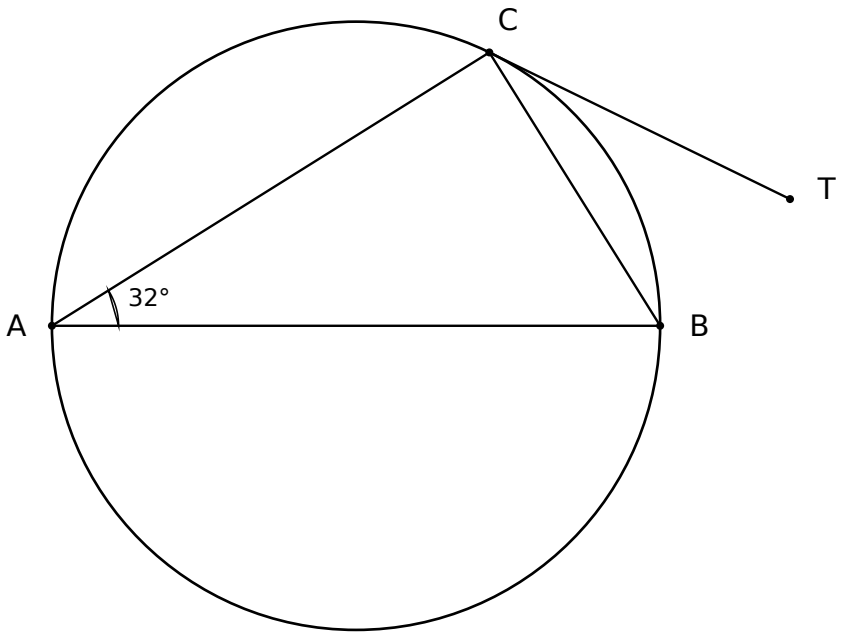
You Do 2

AB is a diameter of a circle. C is on the circle and CT is a tangent at C.

Angle BAC = 32°.

(a) Find angle ABC. (b) Find angle BCT. Give reasons for both answers.

Not accurately drawn



Show all your working and give reasons.

(Total: 4 marks)

Cyclic Quadrilaterals and Radii

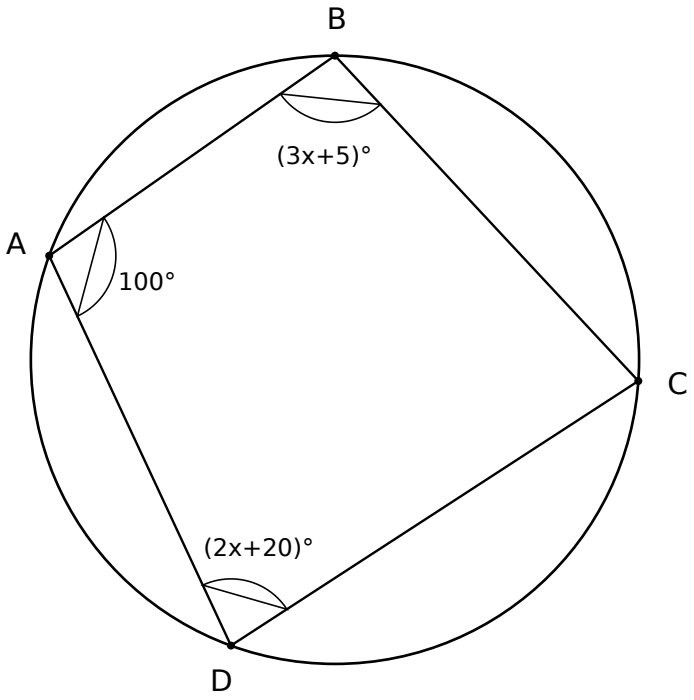
Challenge 1

A, B, C and D lie on a circle.

Angle BAD = 100°, angle ABC = (3x + 5)° and angle ADC = (2x + 20)°.

(a) Find x. (b) Find angle BCD. Give reasons.

Not accurately drawn



Show all your working and give reasons.

(Total: 6 marks)

Cyclic Quadrilaterals and Radii

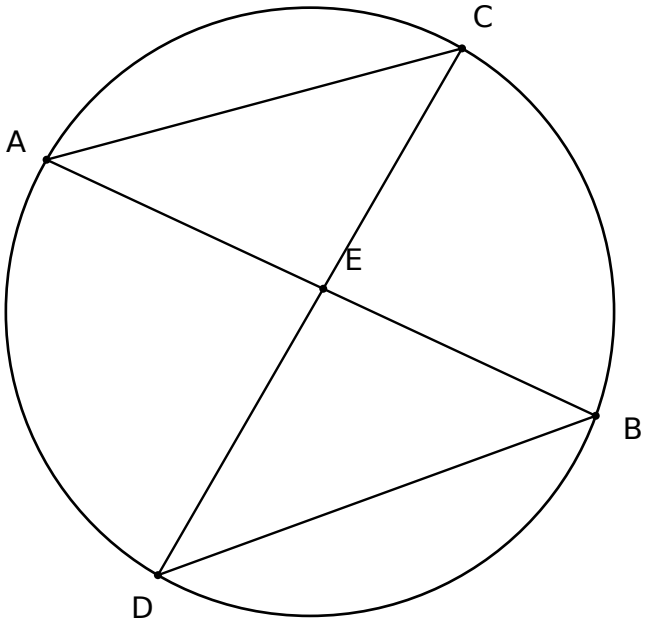
Challenge 2

Chords AB and CD of a circle intersect at E inside the circle.

(a) Prove that triangles AEC and DEB are similar.

(b) Hence prove that EA × EB = EC × ED.

Not accurately drawn



Show all your working and give reasons.

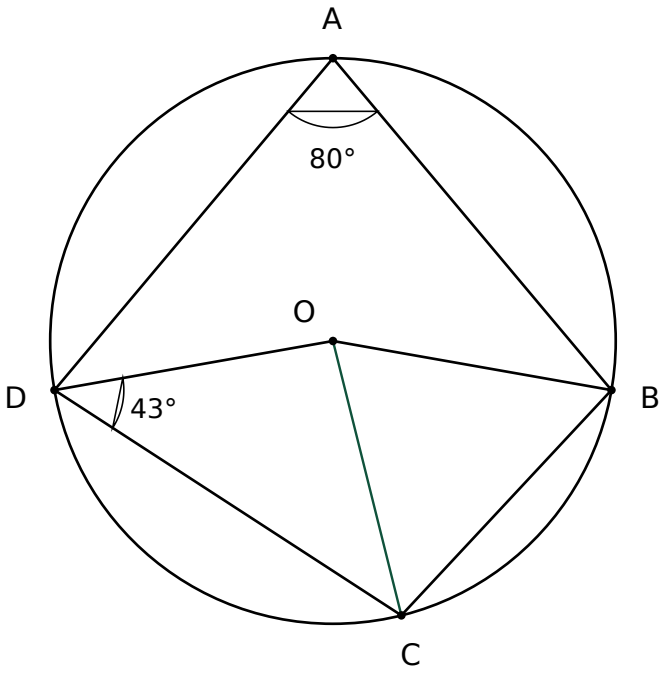
(Total: 6 marks)

Cyclic Quadrilaterals and Radii

I Do — Worked Solution

1. Angle BCD = 180° − 80° = 100° (opposite angles of a cyclic quadrilateral).
2. OD = OC (radii), so angle OCD = angle ODC = 43°.
3. Angle OCB = 100° − 43° = 57°.
4. OB = OC (radii), so triangle OBC is isosceles.
5. Therefore angle OBC = angle OCB = 57°.

Not accurately drawn



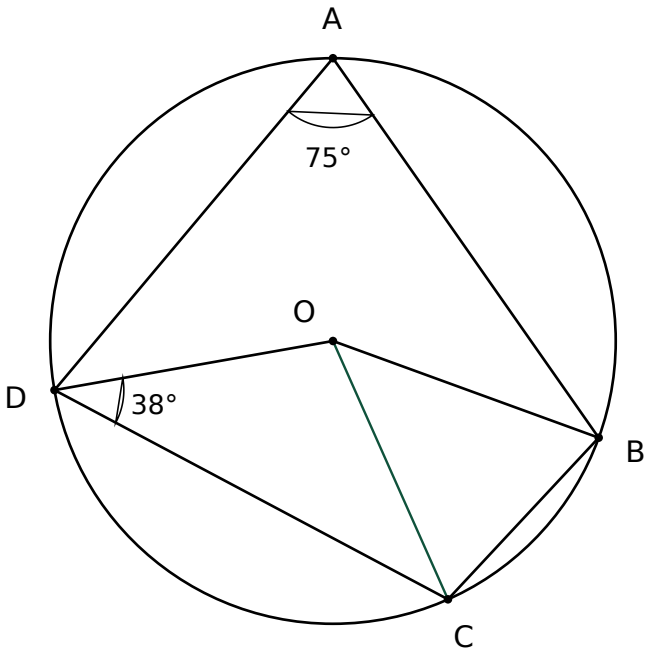
Green dashed lines show added constructions.

Cyclic Quadrilaterals and Radii

We Do — Worked Solution

1. Angle BCD = 180° − 75° = 105° (opposite angles of a cyclic quadrilateral).
2. OD = OC (radii), so angle OCD = angle ODC = 38°.
3. Angle OCB = 105° − 38° = 67°.
4. OB = OC (radii), so triangle OBC is isosceles.
5. Therefore angle OBC = angle OCB = 67°.

Not accurately drawn



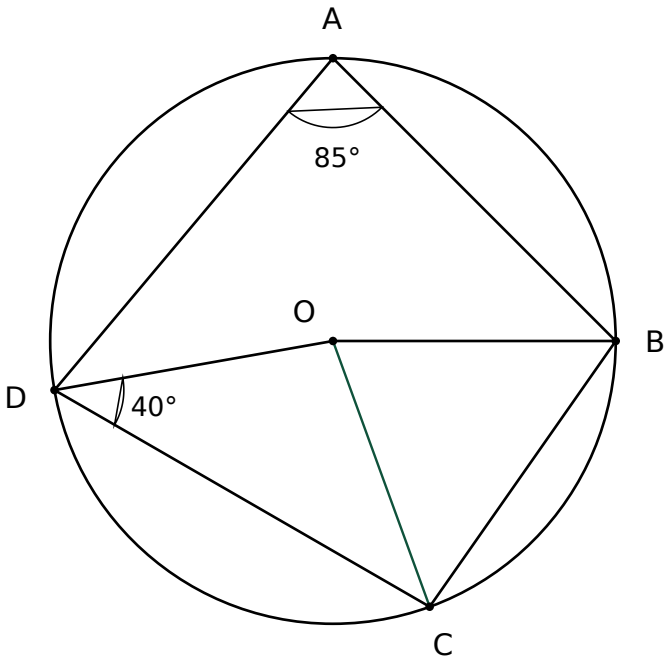
Green dashed lines show added constructions.

Cyclic Quadrilaterals and Radii

You Do 1 — Worked Solution

1. Angle BCD = 180° − 85° = 95° (opposite angles of a cyclic quadrilateral).
2. OD = OC (radii), so angle OCD = angle ODC = 40°.
3. Angle OCB = 95° − 40° = 55°.
4. OB = OC (radii), so triangle OBC is isosceles.
5. Therefore angle OBC = angle OCB = 55°.

Not accurately drawn



Green dashed lines show added constructions.

Cyclic Quadrilaterals and Radii

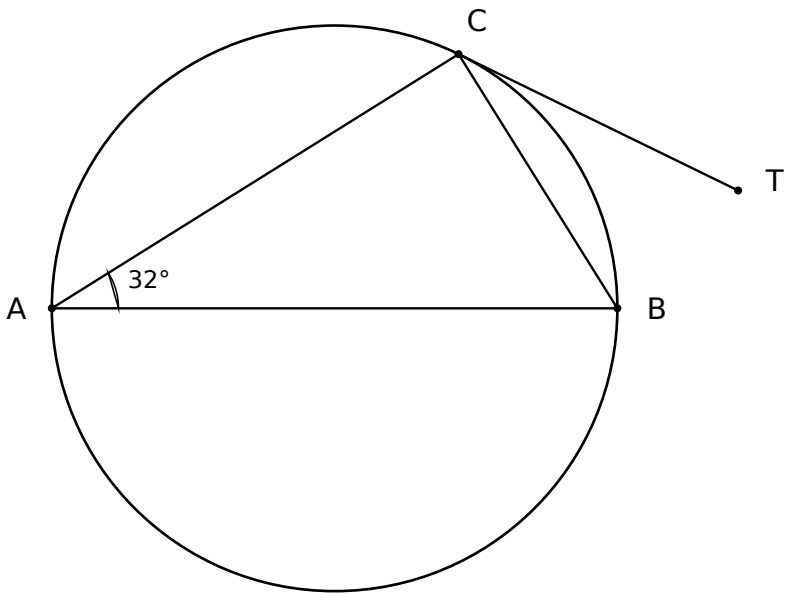
You Do 2 — Worked Solution

1. Angle ACB = 90° (angle in a semicircle).

2. In triangle ABC, angle ABC = 180° − 90° − 32° = 58°.

3. Angle BCT = angle BAC = 32° (alternate segment theorem).

Not accurately drawn



Green dashed lines show added constructions.

Cyclic Quadrilaterals and Radii

Challenge 1 — Worked Solution

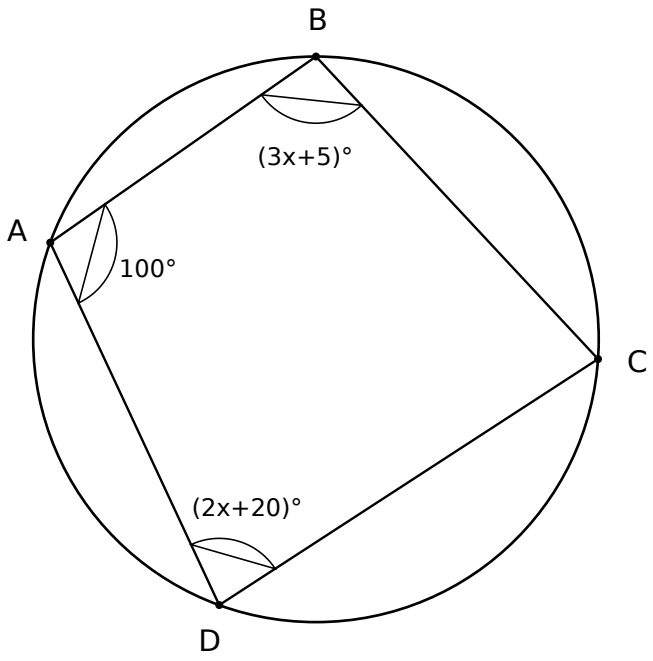
1. Opposite angles ABC and ADC in a cyclic quadrilateral add to 180°.

2. (3x + 5) + (2x + 20) = 180, so 5x = 155 and x = 31.

3. Opposite angles BAD and BCD add to 180°.

4. Angle BCD = 180° − 100° = 80°.

Not accurately drawn



Green dashed lines show added constructions.

Cyclic Quadrilaterals and Radii

Challenge 2 — Worked Solution

1. Angle AEC = angle DEB (vertically opposite angles).

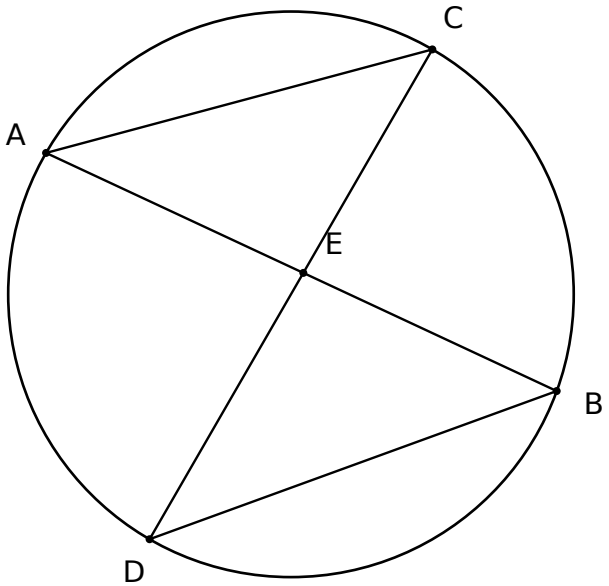
2. Angle EAC = angle EDB: these are angles BAC and CDB in the same segment, subtended by chord BC.

3. Therefore triangles AEC and DEB are similar by AA.

4. Corresponding sides give EA/ED = EC/EB.

5. Cross-multiplying gives EA × EB = EC × ED.

Not accurately drawn



Green dashed lines show added constructions.