Solutions

Marking: **M1** a correct method, **A1** the correct answer.

Each answer shows the steps, then the **result**.

2.1

- angle at the centre is twice the angle at the circumference
- $2 \times 35 = \mathbf{70}^\circ$

2.2

- $\mathbf{90}^\circ$ (angle in a semicircle)

2.3

- opposite angles of a cyclic quadrilateral add to 180°
- $180 - 85 = \mathbf{95}^\circ$

3.1

- angle at the centre is twice the angle at the circumference

$$\frac{1}{2} \times 130 = \mathbf{65}^\circ$$

3.2

- opposite angles add to 180°
- $PSR = 180 - 95 = \mathbf{85}^\circ$
- $SPQ = 180 - 70 = \mathbf{110}^\circ$

3.3

(a)

- $\mathbf{90}^\circ$ — angle in a semicircle, since BD is a diameter

(b)

- angle BDC and angle BAC are in the **same segment**, standing on chord BC
- $\mathbf{32}^\circ$

(c)

- in triangle ABD, angle $BAD = 90^\circ$ and angle $ADB = 54^\circ$
- angle $ABD = 180 - 90 - 54 = \mathbf{36}^\circ$

(d)

- angle AOC at the centre is twice angle ABC at the circumference on the same arc
- $DBC = 180 - 90 - 32 = 58^\circ$, so $ABC = 36 + 58 = 94^\circ$ and $AOC = 188^\circ$ (the reflex angle); the other side is $360 - 188 = \mathbf{172}^\circ$

(e)

- **alternate segment theorem**: the angle between tangent TC and chord CD equals the angle in the alternate segment, angle CBD
- $CBD = 58^\circ$ from (d), so the required angle is $\mathbf{58}^\circ$