

Geometry - Circles: Angles, Chords and Tangents

- Answer Key

Common Core G-C.A.1, G-C.A.2, G-C.A.3, G-C.A.4 · maths-pdf.fr/en/

Use this answer key to check the 20 problems on circle angles. Every solution shows the formula or theorem used, each step of the work, and the final answer in bold. If an answer differs from yours, compare the steps line by line to find where the work changed.

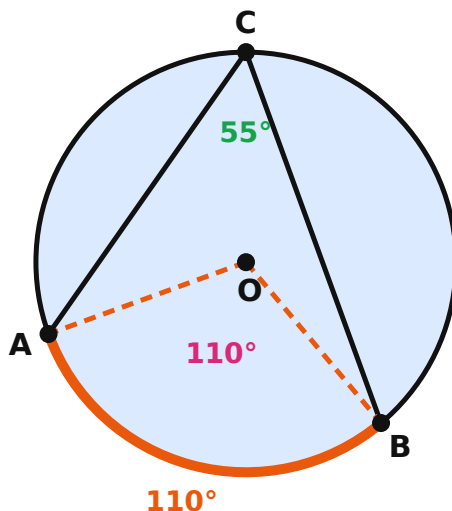
Geometry · Common Core State Standards: **G-C.A.1, G-C.A.2, G-C.A.3, G-C.A.4**

Exercise 1 - Central angle

A central angle equals its intercepted arc.

72°

Exercise 2 - Inscribed angle



An inscribed angle is half of its intercepted arc: $110/2 = 55$.

$$110^\circ \div 2 = 55^\circ$$

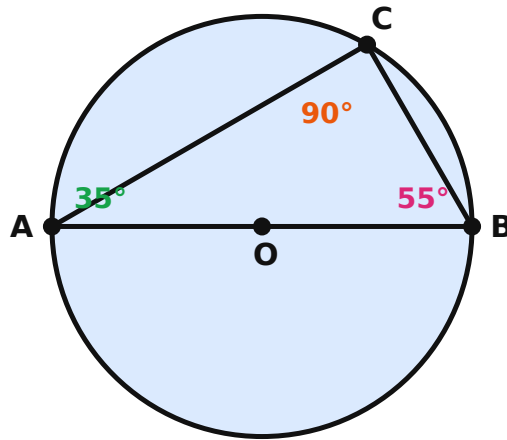
55°

Exercise 3 - Find the arc

$$2 \cdot 47^\circ = 94^\circ$$

$$94^\circ$$

Exercise 4 - Angle in a semicircle



Angle B is 55° .

$\angle ACB = 90^\circ$ because it is inscribed in a semicircle.

$$m\angle B = 180^\circ - 90^\circ - 35^\circ = 55^\circ$$

$$55^\circ$$

Exercise 5 - Same arc, same angle

Inscribed angles on the same arc are congruent.

$$3x + 5 = 5x - 15$$

$$x = 10$$

$$3(10) + 5 = 35^\circ$$

$$x = 10; 35^\circ$$

Exercise 6 - Central and inscribed

$$4x - 30 = 2(x + 20)$$

$$2x = 70$$

$$x = 35$$

Central angle: 110° ; inscribed angle: 55° .

x = 35; 110° and 55°

Exercise 7 - Inscribed quadrilateral

Opposite angles are supplementary.

$$m\angle C = 180^\circ - 82^\circ = 98^\circ$$

$$m\angle D = 180^\circ - 95^\circ = 85^\circ$$

98° and 85°

Exercise 8 - Inscribed quadrilateral algebra

$$(3x + 7) + (5x - 27) = 180$$

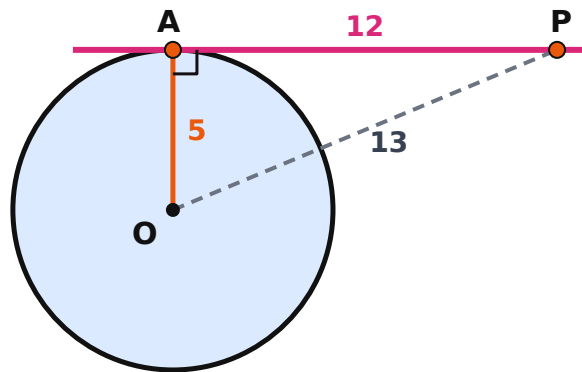
$$8x - 20 = 180$$

$$x = 25$$

A = 82° and C = 98° .

x = 25; 82° and 98°

Exercise 9 - Tangent and distance



A tangent is perpendicular to the radius at the point of tangency.

The tangent is perpendicular to the radius, so triangle OAP is a right triangle.

$$OP = \sqrt{5^2 + 12^2} = 13$$

$$\mathbf{OP = 13}$$

Exercise 10 - Equal tangent segments

Tangent segments from one point are congruent.

$$3x + 4 = 5x - 10$$

$$x = 7$$

$$PA = 25$$

$$\mathbf{x = 7; PA = 25}$$

Exercise 11 - Tangent and radius angle

$$\angle OAP = 90^\circ.$$

$$180^\circ - 90^\circ - 64^\circ = 26^\circ$$

$$\mathbf{26^\circ}$$

Exercise 12 - Chord from a central angle

The central triangle has two sides of 10 and a 60° angle between them, so it is equilateral.

Exercise 13 - Distance to a chord

The perpendicular from the center bisects the chord: half is 12.

$$d = \sqrt{13^2 - 12^2} = 5$$

$$d = 5$$

Exercise 14 - Arcs add to 360

$$80 + 95 + 110 + x = 360$$

$$x = 360 - 285 = 75$$

$$75^\circ$$

Exercise 15 - Tangent-chord angle

$$130^\circ \div 2 = 65^\circ$$

$$65^\circ$$

Exercise 16 - Chords crossing inside

$$\frac{70^\circ + 50^\circ}{2} = 60^\circ$$

$$60^\circ$$

Exercise 17 - Circles of a triangle

Circumradius: $10 \div 2 = 5$.

Inradius: $\frac{6+8-10}{2} = 2$.

5 and 2

Exercise 18 - All circles are similar

Scale factor: $\frac{8}{3}$.

Circumference ratio equals the scale factor: $\frac{8}{3}$.

Area ratio: $\left(\frac{8}{3}\right)^2 = \frac{64}{9}$.

$\frac{8}{3}$; $\frac{8}{3}$; $\frac{64}{9}$

Exercise 19 - Ferris wheel

$$360^\circ \div 8 = 45^\circ.$$

The chord is $2 \cdot 20 \cdot \sin 22.5^\circ = 15.3$ feet.

45° ; 15.3 ft

Exercise 20 - Round pond

$$OP = \sqrt{15^2 + 20^2} = 25$$

25 feet