

# Circle Theorem

Apply the correct circle theorem to find each missing angle.



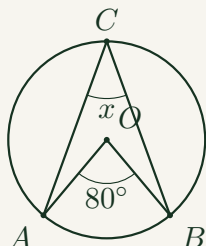
Name \_\_\_\_\_

Date \_\_\_\_\_

## Name the theorem first

Before calculating, state which of the five circle theorems applies. Show your equation, then solve for the unknown.

**Worked example** The angle at the centre is  $80^\circ$ . Find the angle at the circumference,  $x$ , on the same arc.



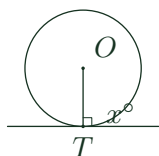
The angle at the centre is double the angle at the circumference.

$$80 = 2x$$

$$x = 40^\circ$$

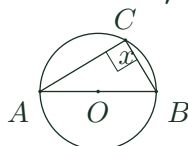
1. Find the angle  $x$ .

**Solution:** Tangent-radius;  $x = 90^\circ$



2. Find the angle  $x$ .

**Solution:** Semicircle;  $x = 90^\circ$



3. Find the angle  $x$ .

**Solution:**  $x = 70 \div 2 = 35^\circ$



4. Find the angle  $x$ .

**Solution:**  $x = 2 \times 56 = 112^\circ$



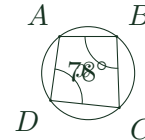
5. Find the angle  $x$ .

**Solution:** Same segment;  $x = 38^\circ$



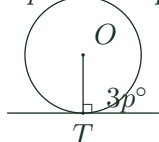
6. Find the angle  $x$ .

**Solution:**  $x = 180 - 78 = 102^\circ$



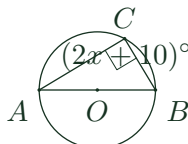
7. Find  $p$ .

**Solution:**  $3p = 90 \Rightarrow p = 30$



8. Find  $x$ .

**Solution:**  $2x + 10 = 90 \Rightarrow x = 40$



9. Find the angle  $x$ .

**Solution:**  $x = 96 \div 2 = 48^\circ$



# Circle Theorem (continued)

Apply the circle theorems, including multi-part and algebraic problems.



Name \_\_\_\_\_

Date \_\_\_\_\_

**10.** Find the angle  $x$ .

**Solution:** Same segment;  $x = 61^\circ$



**11.** Find the angle  $x$ .

**Solution:**  $x = 180 - 115 = 65^\circ$



**12.** Find the angle  $x$ .

**Solution:**  $x = 2 \times 65 = 130^\circ$



**13.** A tangent touches a circle at  $T$ . Find the angle between the tangent and radius  $OT$ .

**Solution:**  $90^\circ$

**14.** The centre angle is  $4x^\circ$ ; the same-arc circumference angle is  $(x + 15)^\circ$ . Find  $x$ .

**Solution:**  $4x = 2(x + 15) \Rightarrow x = 15$

**15.** Two angles in the same segment are  $(3y - 4)^\circ$  and  $41^\circ$ . Find  $y$ .

**Solution:**  $3y - 4 = 41 \Rightarrow y = 15$

**16.** Opposite angles in a cyclic quadrilateral are  $(5z + 10)^\circ$  and  $110^\circ$ . Find  $z$ .

**Solution:**  $5z + 10 + 110 = 180 \Rightarrow z = 12$

**17.** A tangent meets a radius at angle  $(4w - 6)^\circ$ . Find  $w$ .

**Solution:**  $4w - 6 = 90 \Rightarrow w = 24$

**18.** The centre angle is  $140^\circ$ . Find the same-arc circumference angle and the radii triangle's base angles.

**Solution:**  $70^\circ$ ; base angles  $20^\circ$  each