

Angles in the Same Segment — Worked Solutions

Angles subtended by the same chord at the circumference, in the same segment, are equal.

1. Identifying the segments

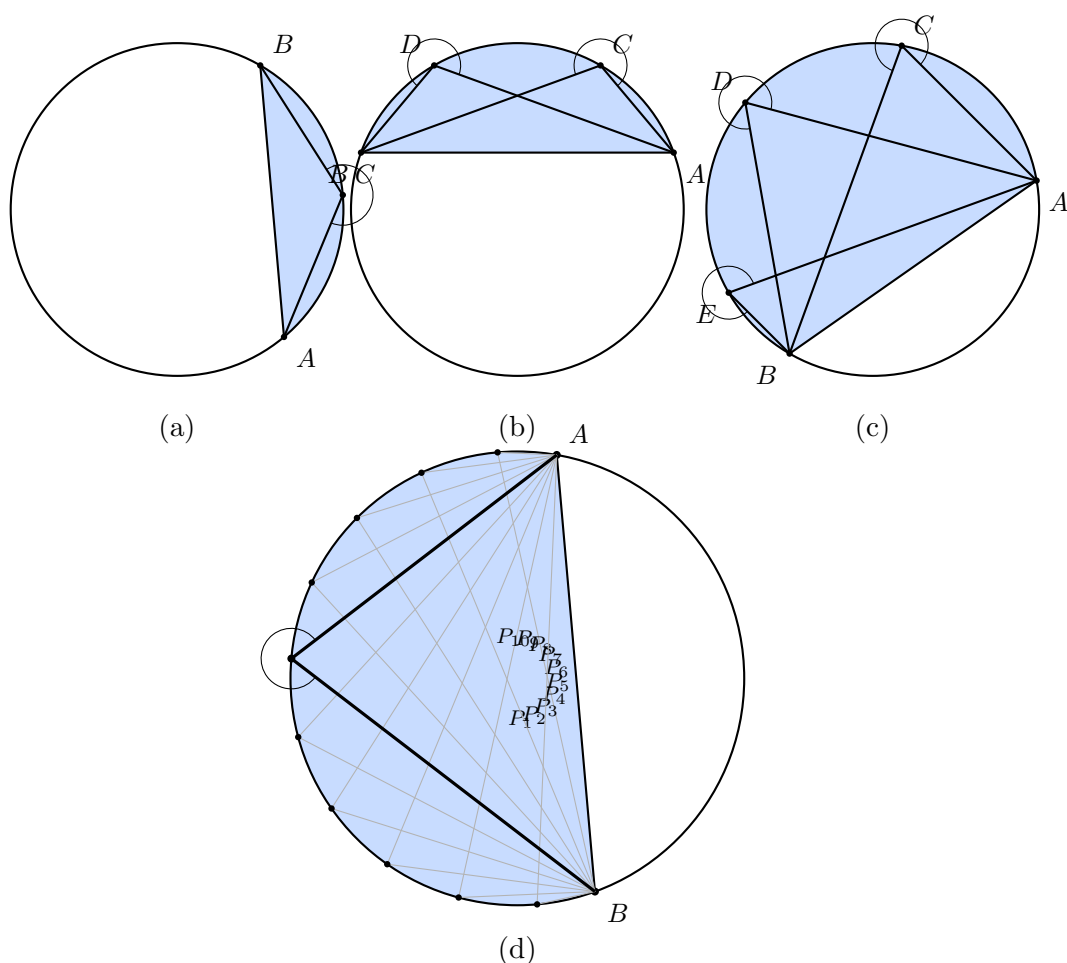
A **segment** is the region bounded by a chord and one of the arcs it cuts off. A **sector** is the region bounded by two radii and the arc between them.

	Left	Middle	Right
Row 1	✓ segment	sector	neither
Row 2	✓ segment	sector	✓ segment
Row 3	✓ segment	sector	neither
Row 4	✓ segment	sector	✓ segment

The shaded region in Row 2, Right is the *major* segment; it is still a segment.

2. Angles in a given segment

The vertex of each angle must lie on the circumference of the shaded segment. One valid set of angles is shown below. In each case the marked angles all stand on chord AB . Any other points on the same shaded arc would also work; by the theorem all these angles are equal.

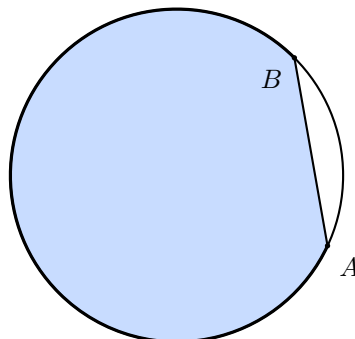
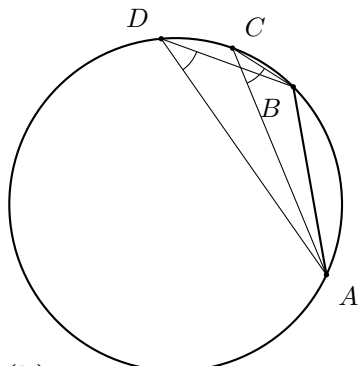


For (d), the grey lines show the other nine angles; the thicker angle is one of them. All ten angles are equal because they are in the same segment.

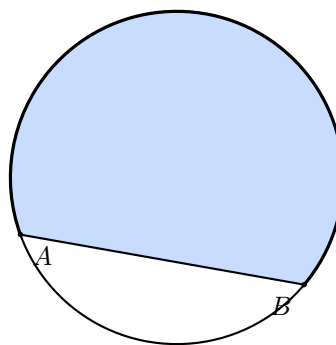
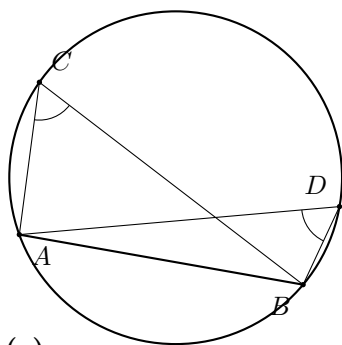
3. Interpreting the theorem

In each pair below, the left diagram shows the two equal angles. The right diagram has the correct **segment** shaded, and the heavy arc is the arc containing the vertices of the equal angles.

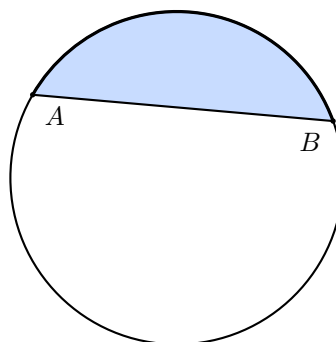
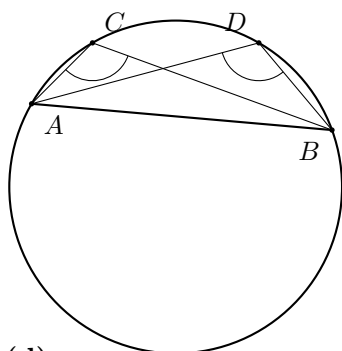
(a)



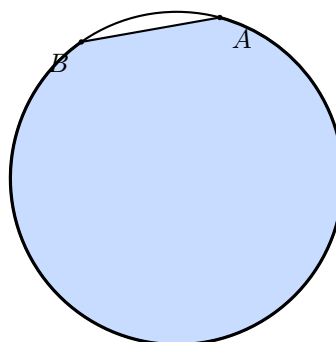
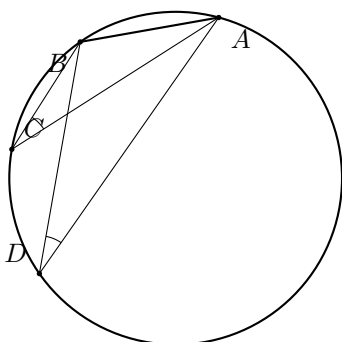
(b)



(c)



(d)



In (a), (b) and (d), the vertices C and D lie on the *major* arc, so the major segment is shaded. In (c), C and D lie on the *minor* arc, so the minor segment is shaded. In every case, the shaded region is the segment referred to by the theorem.