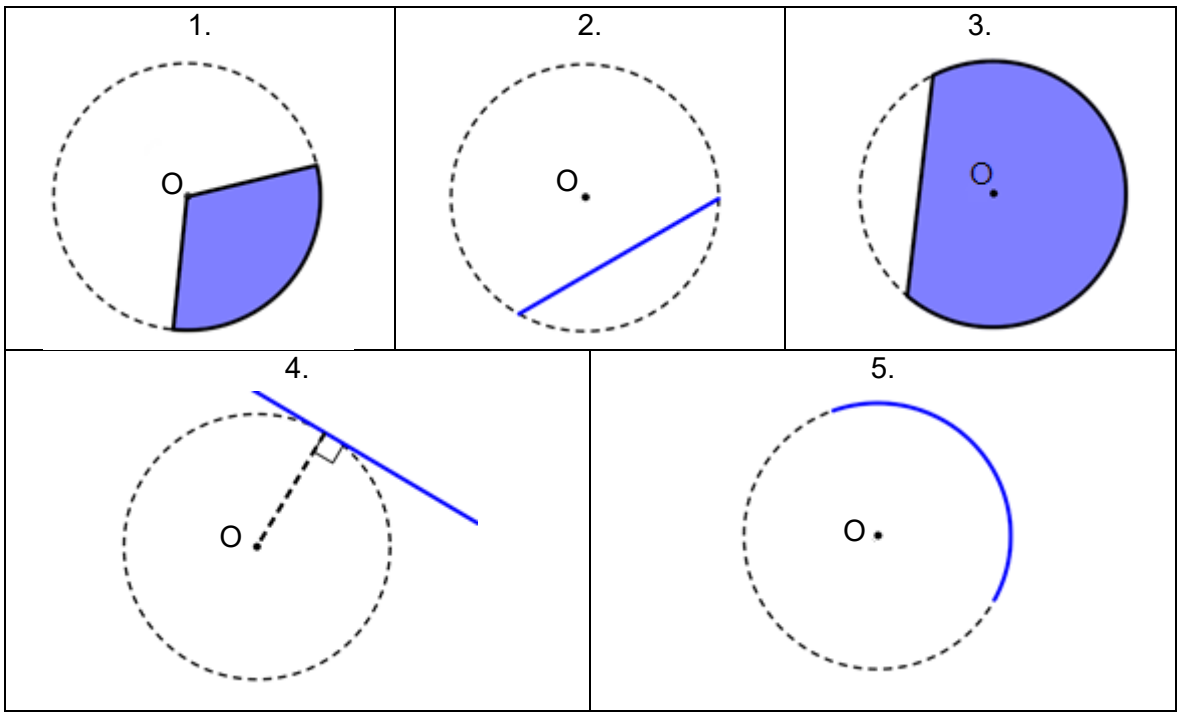
OCR
Oxford Cambridge and RSA

Foundation Check In - 8.05 Circles

Each of these circles has its centre at O. Name the following parts of these circles.



Decide whether the statements in questions 6 and 7 are **sometimes true**, **always true** or **never true**. Explain your reasoning.

6. A chord on a circle is shorter than a diameter of that circle.

7. If two points are drawn on the circumference of a circle, the route between them on a chord is always shorter than the route between them on an arc.

8. A semicircle is drawn on a page. Violet says it is also a sector. Max says it is also a segment. Who is correct? Explain your reasoning.

9. Draw a circle of radius 6 cm. Mark a point on the circumference of the circle. Using just a pair of compasses, a pencil and a ruler, construct a tangent to the circle at this point.

10. A circle has nine points spaced equally around its circumference. A chord is drawn connecting two of the nine points. How many different lengths of chord are possible? (You do not need to work out the lengths of the chords.)

Extension

Consider the circle in question 10. If there were ten equally spaced points on the circumference, how many different lengths of chords are possible? How about n points?

Answers

1. Sector (or minor sector)

2. Chord

3. Segment (or major segment)

4. Tangent

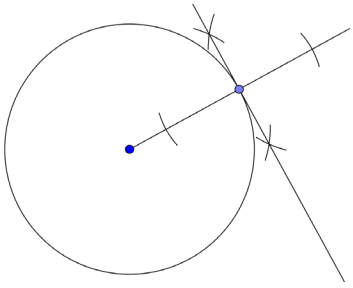
5. Arc (or minor arc)

6. Sometimes true. When a chord goes through the centre of a circle it will be the same as a diameter, however chords not going through the centre of the circle will always be shorter than the diameter.

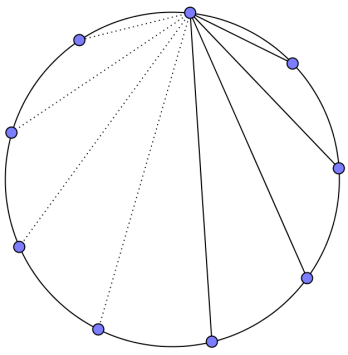
7. Always true. The shortest distance between two points on a 2D surface is a straight line. A curved path will always be longer.

8. Both are correct. Violet is correct since a sector is enclosed by two radii and an arc: the diameter of the semicircle can be split into two radii. Max is correct since a segment is enclosed by a chord and an arc: the diameter of the semicircle is a chord.

9. Tangents to a circle are at 90° to a radius, therefore (a) draw a radius from the centre of the circle to the point, then (b) construct a perpendicular line to the radius that passes through the point.

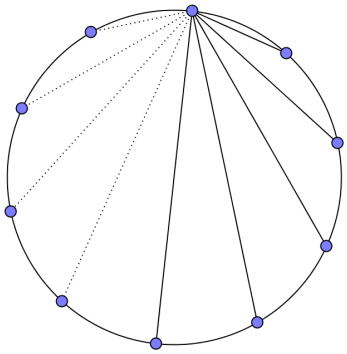


10. Choosing a single point to draw a chord from, there are eight possibilities for the second end point of the chord. However because of the symmetry of the circle, four of these (shown as dotted lines below) will be mirror images of other chords and therefore the same length. There are four distinct lengths of chord joining these nine points.



Extension

With ten points, there are nine chords from a given point. However, the chord that is a diameter will not have a mirror image. Therefore, five different lengths of chord will be possible.



With n points:

- For an odd number of equally spaced points on the circumference of a circle, there will be $\frac{n-1}{2}$ different lengths of chord.
- For an even number of equally spaced points on the circumference of a circle, there will be $\frac{n}{2}$ different lengths of chord.

GCSE (9–1)

MATHEMATICS

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Understand the term sector			
AO1	2	Understand the term chord			
AO1	3	Understand the term segment			
AO1	4	Understand the term tangent			
AO1	5	Understand the term arc			
AO2	6	Understand and use the terms chord and diameter			
AO2	7	Understand and use the terms chord and arc			
AO2	8	Understand and use the terms semicircle, segment and sector			
AO3	9	Understand the term tangent and construct the perpendicular to a line at a point			
AO3	10	Solve a problem involving chords			

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