Activity 14   Angle at the centre

Aim: Verify and prove angle in a semicircle is a right angle.
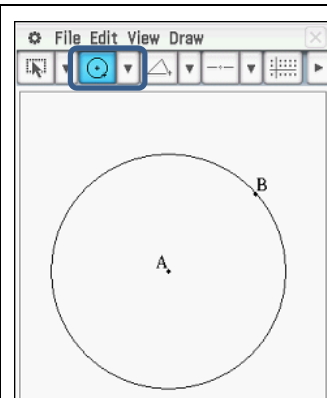
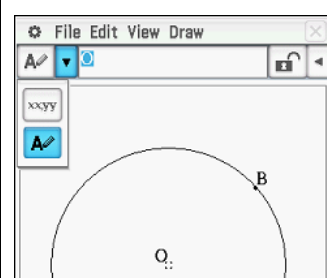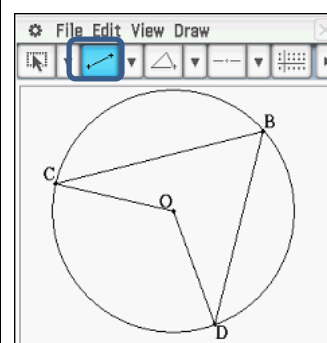|	
Construct diagram **Setup** • Open Geometry • Select [File | New] (if required) • Tap ▦ to cycle through axes options until the screen is blank **Draw circle** • Select ⊙ the draw circle tool • Tap near the middle of the screen • Tap roughly where point B is	File Edit View Draw *(circle with point A near centre and B on circumference)*
Relabel centre • Tap ▶ to go around the corner • Tap on the centre of the circle • Select A✎ the label tool • Enter O in the measurement box • Tap the lock to change	File Edit View Draw *(circle with points B and O)*
Draw lines • Tap ◀ to go around the corner • Select ╱ the draw line segment tool • Tap on one end of the line segment and then tap on the other end • Complete the diagram as shown	File Edit View Draw *(circle with points C, B, O, D and line segments)*
Measure angle at circumference • Tap ▶ to go round the corner • Tap in open space • Tap on BC • Tap on BD • Select ◿ the angle measure (if required) • Tap ◿ to add measurement to the drawing **Measure angle at centre** • Repeat to add the measure of angle COD	File Edit View Draw 123.2742 ∠CBD: 61.64 ∠COD: 123.27 *(circle with points C, B, O, D)*

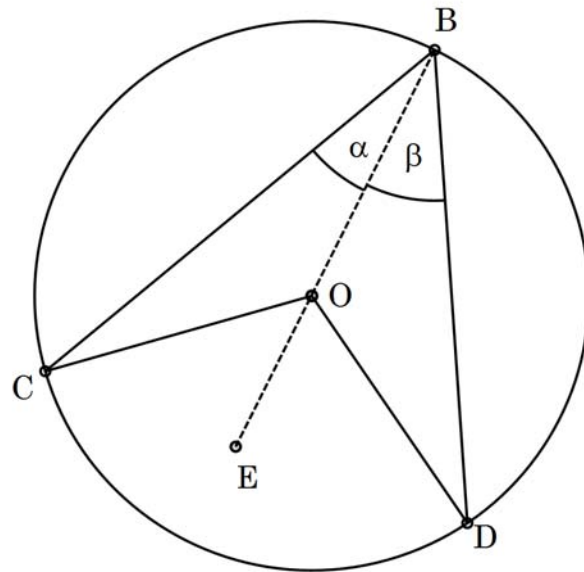Mathematics: Specialist Units 1 & 2 - ClassPad activities
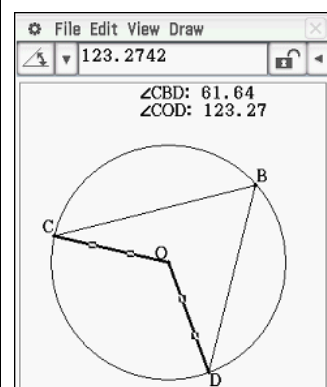
1. Drag points C and D around the circle. What do you notice about the size of the angle at the centre of the circle compared to the angle at the circumference?

2. Write this observation as a conjecture.

3. Complete the proof by:
   a) Completely labelling the diagram to show the steps in the proof;
   b) providing reasons for steps (i) to (vi).

Statement		Reason
Let ∠CBO = a and ∠DBO = β		
OB = OC = OD	(i)	_____
∠BCO = a	(ii)	_____
∠COB = 180°−2a	(iii)	_____
∠COE = 2a	(iv)	_____
∠BDO = β	(v)	_____
∠DOB = 180°−2β	(vi)	_____
∠DOE = 2β	(vii)	_____
∠COD = 2a + 2β	(viii)	_____
=2(a + β)		
=2∠ABC		

Save the file for later use.	
• Select [File | Save] • Enter an appropriate name e.g. circTh1 • Tap OK	

4. When does the ClassPad not show the angle at the centre being double the angle at the circumference?

5. Drag point B around the circumference. What do you notice about the size of $\sphericalangle CBD$?
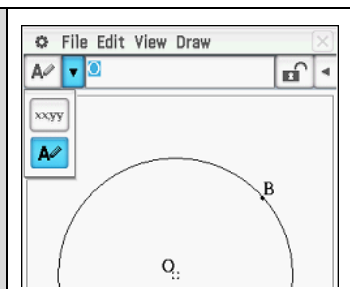
Learning notes

Interactive geometry software is an alternative to using ClassPad geometry.

The display can be adjusted by tapping in open space then tapping on the measurement and editing the label.

Relabel a point	
• Tap ▶ to go around the corner • Tap on point • Select 🅰️✏️ the label tool • Enter the new label in the measurement box • Tap the lock to change	

For the following activities in this chapter, it is assumed you can construct the diagrams in ClassPad. Detailed instructions are only provided for new features.

Approach to proof:

- Draw the diagram, large is better.
- Mark on all the information you have and are deducing.
- Then write the proof.