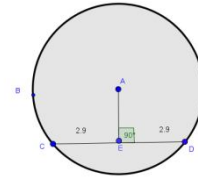# Theorem 21

Theorem:

  (i) The perpendicular from the centre to a chord bisects the chord.

  (ii) The perpendicular bisector of a chord passes through the centre.

Equipment: Student Activity sheet contained on page 2 of this lesson, blank sheet of paper, ruler and compass for each student

Target Students: Fifth Year Ordinary level

Prior Knowledge: Knowledge of and the capability to draw a circle, chord of a circle, perpendicular line, bisector and right angle.

Lesson: Distribute the equipment to each student and let students progress through the Theorem 21 Student Activity sheet Section 1 (Page 2 of this document.)

When students have completed the activity sheet section 1 have a class discussion on the theorem part (i). Gather the data obtained by all the students in the class, so if there are 20 students and each did 3 circles you have the results of 60 trials. Discuss each action in the Student Activity.

Then allow students to complete section 2 of the activity sheet.

Conclude the lesson with a general discussion of the theorem. Again base your discussion on the fact that the exercise has been completed 3 multiplied by the number of students in the class times. If time permits the interactive file based on this theorem in the Student Disk can be viewed and the associated Student Activity embarked upon.   Also depending on the ability of the students the following application could be given as an exercise.

Application of this theorem: To find the centre of a circle if this is unknown.

Assuming part (ii) of the theorem is known to be true. Draw any two chords of the circle. Draw a perpendicular bisector of each chord. The point of intersection of the perpendicular bisectors is the centre of the circle.
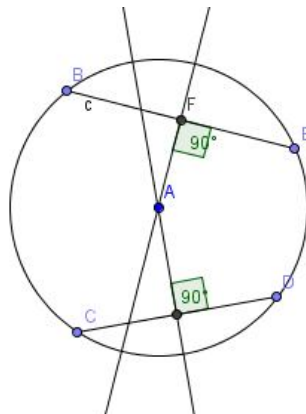
Theorem 21 Student Activity Sheet
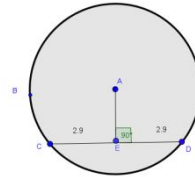
Section 1

Complete the following:

1. On the blank sheet of paper provided, draw a circle.
2. Draw a chord AB on your circle.
3. Draw a perpendicular from the centre of the circle to the chord.
4. Label the point of intersection of the chord and the perpendicular line as M.
5. Measure the distances AM and MB.
6. Repeat steps 1 to 5 for two more circles of different radius.
7. Do you see any pattern, if so describe the pattern.

Section 2

Complete the following:

1. On the back of the blank sheet of paper used in Section 1, draw a circle.
2. Draw a chord AB on your circle.
3. Bisect the chord. Call the midpoint M.
4. Draw a line segment from M to the centre of the circle.
5. Measure the angle between the chord and the line drawn in part (4).
6. Repeat step 1 to 5 for two more circles of different radius.
7. Do you see a pattern develop, if so describe the pattern.
8. How does Section 1 differ from Section 2?