DEPARTMENT OF MATHEMATICS
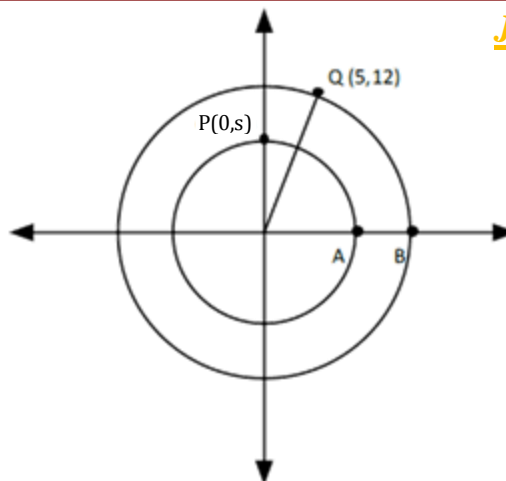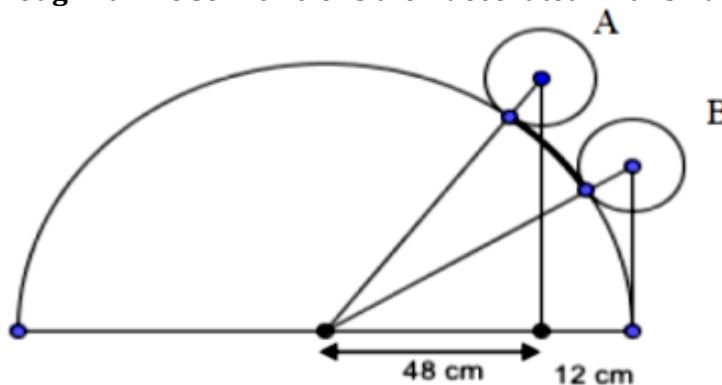
PROBLEM SOLVING CHALLENGE

Q1. *Junior Cycle*

Two circles are centred at the origin, as shown.
The point Q(5,12) is on the larger circle.
The point P(0,s) is on the smaller circle.
If |AB| = 3 , what is the value of *s*?

Q2. *Senior Cycle*

The diagram below shows part of a security barrier placed above a gate at St. John's College, Johannesburg, South Africa. The barrier is in the shape of a semicircle with a number of evenly-spaced vertical bars running through it. The semicircle is then decorated with smaller circles as shown:

The vertical bars in the semi-circle are evenly spaced with a gap of 12 cm between successive bars. The exterior diameter of circles A and B is also 12cm. The centre of circle A is vertically above the first vertical bar inside the inner semi-circle. The centre of circle B is vertically above the right edge of the inner semicircle. How far apart on the semi-circle are the points of tangency of circles A and B to the semi-circle? The situation is illustrated in the diagram.

Answers on an A4 sheet with your __Name__, __Year__ and __Class__ should be handed into the box in the office before 4pm on Friday 24th of October

Monthly Prize for both Junior and Senior Cycle.

Good Luck.

Junior Cycle students answer question 1 only.   *Senior Cycle students answer question 2 only*