

SEPTEMBER
2015

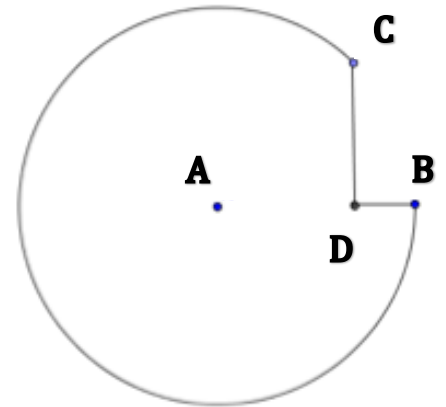
DEPARTMENT OF MATHEMATICS

PROBLEM SOLVING CHALLENGE

Q1.

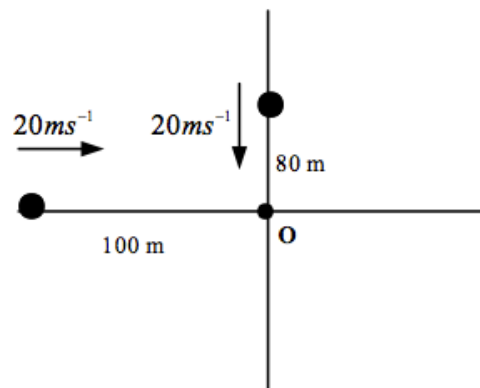
Junior Cycle

A machine-shop cutting tool has the shape of a notched circle, as shown. The radius of the circle is 50 cm, the length of CD is 6 cm. The angle CBD is a right angle. Find the distance from D to the centre of the circle (A).



Q2. The Point O is the intersection of two roads that cross at right angles as shown. One car travels towards O from the north at $20ms^{-1}$ while the second travels due east towards O also at $20ms^{-1}$.

Senior Cycle



- (a) Show that after t seconds their distance apart, d , is given by

$$d = \sqrt{(100 - 20t)^2 + (80 - 20t)^2}$$

- (b) Show that this simplifies to

$$d^2 = 400[(5 - t)^2 + (4 - t)^2]$$

- (c) Show, without using calculus, that the minimum distance between the two cars is $10\sqrt{2}m$.

Answers on an A4 sheet with your Name, Year and Class should be handed into the office or given to Mr. McEvoy before 4pm on Friday 25th of September

Monthly Prize for both **Junior** and **Senior** Cycle.*

Good Luck.

Junior Cycle students answer question 1 only.

Senior Cycle students answer question 2 only