IBDP SL Mathematics

Applications & Interpretation

Year 1 – Semester 2 Final Examination - Paper 2

Question 1

[Maximum mark: 15]

ABC is a triangular field on horizontal ground. The lengths of AB and AC are 70 m and 50 m respectively. The size of angle BCA is 78°.

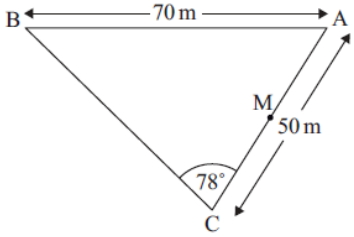


diagram not to scale

(a) Find the size of angle ABC. *[3]*

(b) Find the area of the triangular field. *[4]*

M is the midpoint of AC.

(c) Find the length of BM. *[3]*

A vertical mobile phone mast, TB, is built next to the field with its base at B. The angle of elevation of T from M is 63.4°. N is the midpoint of the mast.

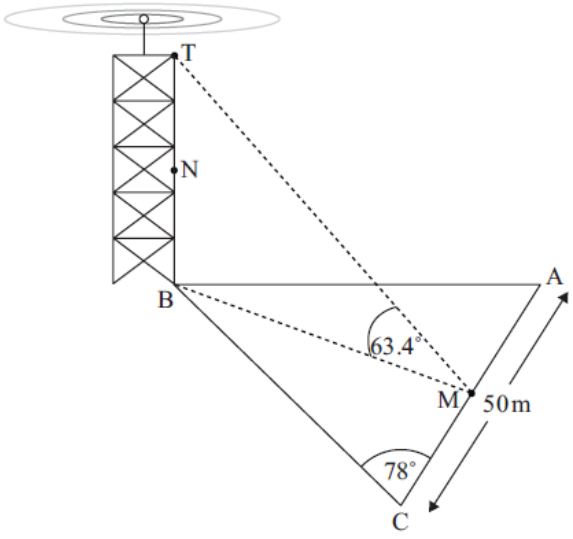


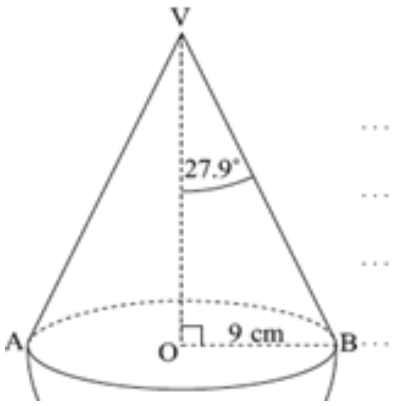
diagram not to scale

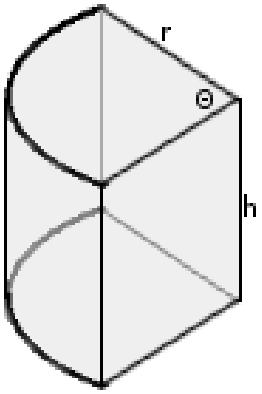
(d) Calculate the angle of elevation of N from M. *[5]*

Question 2 (11 marks)

The contents of a conical bin will be emptied into a cylindrical sector.

Calculate the volumes of each solid in order to answer: will the cylindrical sector overflow?





sector perimeter = 40 cm

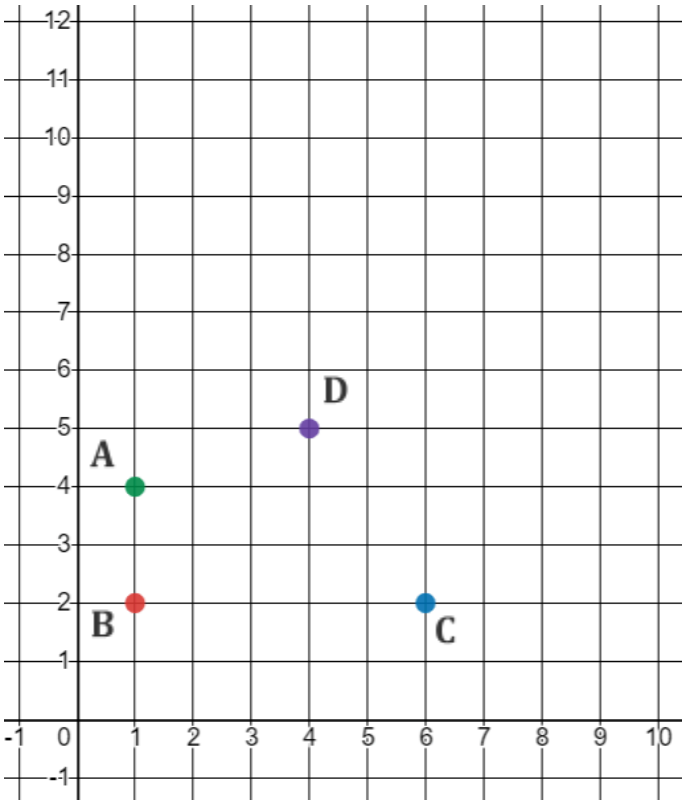
radius = 14 cm

height = 15 cm

Question 3

[Maximum mark: 10]

Four locations, marked as points A, B, C, and D are given on the co-ordinate plane below.



(a) Sketch the perpendicular bisectors of:

i) the segment connecting points A and B, and; *[1]*

ii) the segment connecting points B and C *[1]*

(b) The equation of the perpendicular bisector of the segment connecting points A and D is $y + 3x = 12$.

Using this equation, add this perpendicular bisector to the diagram. *[2]*

(c) Algebraically, find the equation of the perpendicular bisector of the segment connecting points D and C. *[4]*

(d) Complete the Voronoi diagram for points A, B, C, D *[2]*