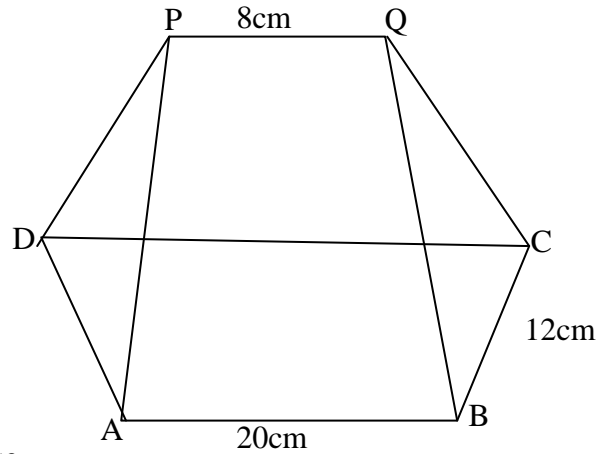


1. Three dimensional geometry

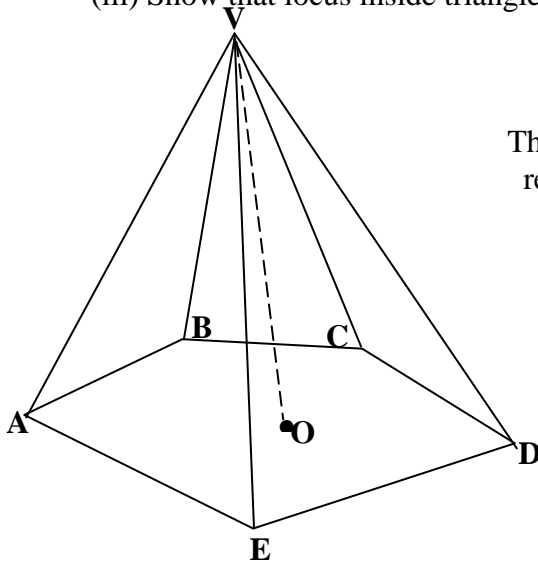
1. The figure below represents a plan of a roof with a rectangular base ABCD. AB = 20cm and BC=12cm. the ridge PQ = 8cm is centrally placed. The faces ADP and BCQ are equilateral triangles. N is the mid-point of BC



Calculate:

- QN
- The altitude of P above the base
- The angle between the planes ABQP and ABCD
- (i) Locus P and locus Q meet at X. Mark X
 (ii) Construct locus R in which angle BRC is 120°
 (iii) Show that locus inside triangle ABC such that $XS \geq R$

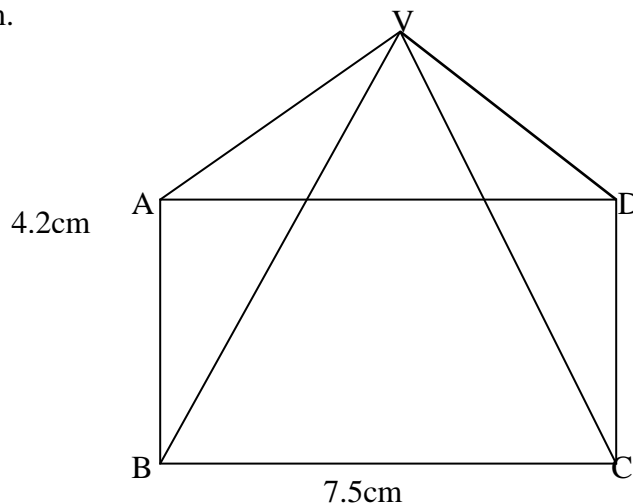
2.



The diagram alongside shows a right pyramid whose base is a regular pentagon of side 10cm. $VA=VB=VC=VD=VE=18.2\text{cm}$ and O is the centre of the pyramid. Calculate;

- height of the pyramid
- area of the pentagon
- angle between the face VAB and the base of the pyramid
- The pyramid is a container filled with orange juice. Calculate the amount of juice in it.
- find the surface area of the face VCD

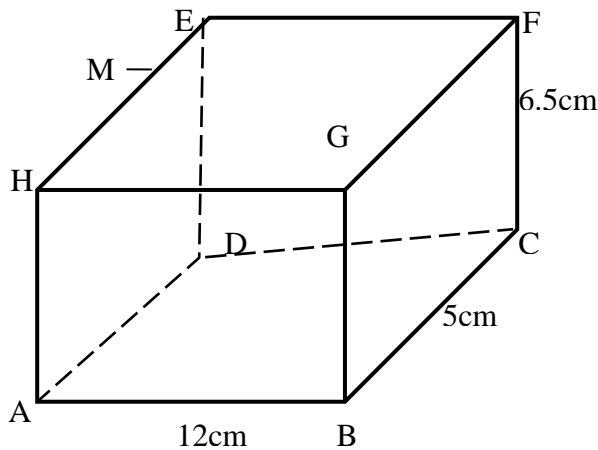
3. The diagram below shows a right pyramid on a rectangular base ABCD measuring 7.5cm by 4.2cm.



If the volume of the pyramid is 52.5cm^3 , **find**:-

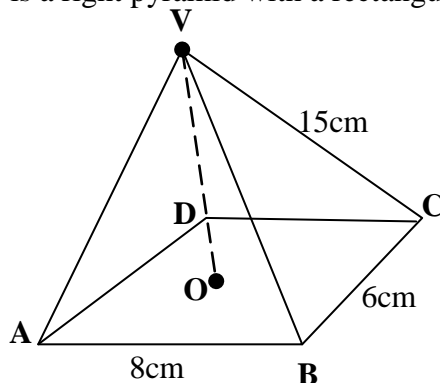
- (i) The height of the pyramid
- (ii) The length of a slanting edge correct to 1 decimal place
- (iii) The angle between AV and CV
- (iv) The obtuse angle between the edges AB and VD

4. The figure below is cuboid ABCDEFGH. $AB = 12\text{cm}$, $BC = 5\text{cm}$, $CF = 6.5\text{cm}$



Calculate:

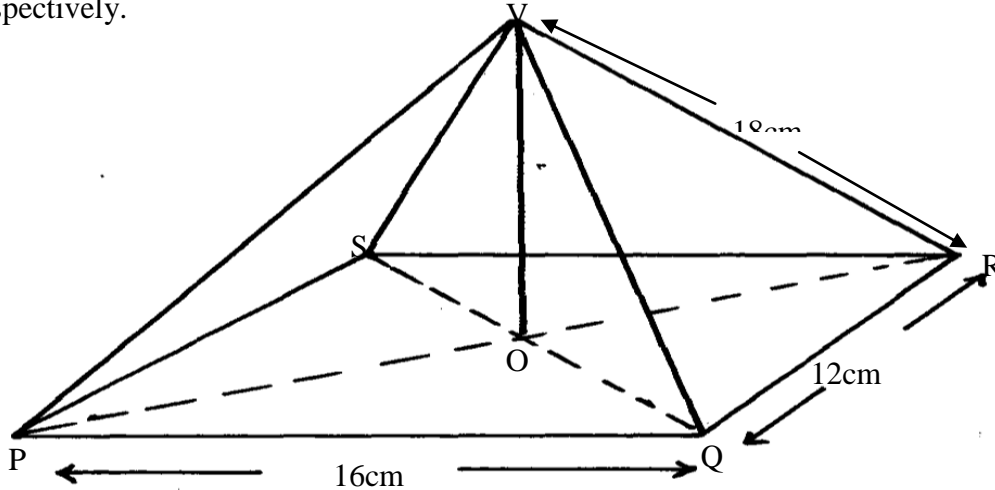
- (a) the length BD
 - (b) the angle AF makes with the base ABCD
 - (c) the angle DHGC makes with the base ABCD
 - (d) **M** is the mid-point of HE. Calculate the length of line MC and the angle line MC makes with the base ABCD
5. The figure below is a right pyramid with a rectangular base ABCD and vertex V.



O is the centre of the base and M is a point on OV such that $OM = \frac{1}{3} OV$, $AB = 8\text{ cm}$, $BC = 6\text{ cm}$ and $VA = VB = VD = VC = 15\text{ cm}$. Find ;

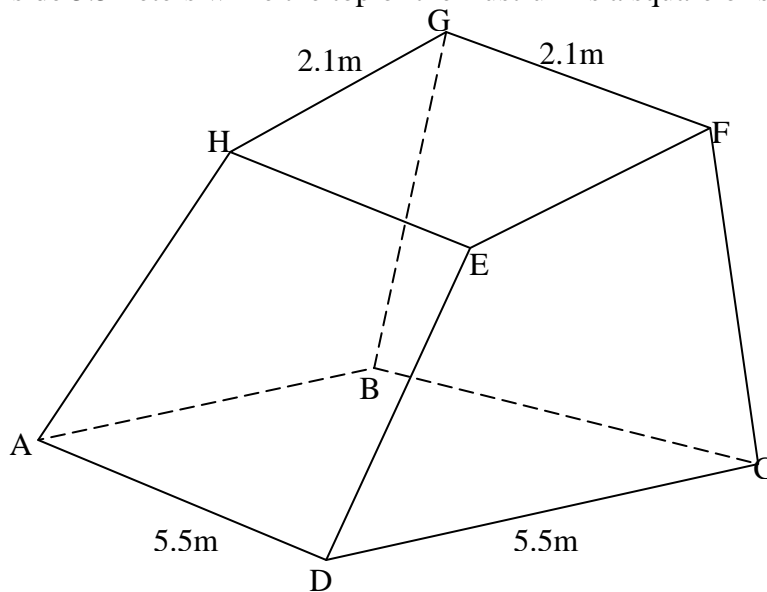
- i) The height OV of the pyramid.
- ii) The angle between the plane BMC and base ABCD.

6. The figure below represents a right pyramid with vertex V and a rectangular base PQRS, $VP=VQ=VR=VS=18\text{cm}$, $PQ=16\text{cm}$ and $QR=12\text{cm}$. M and O are the midpoints of QR and PR respectively.



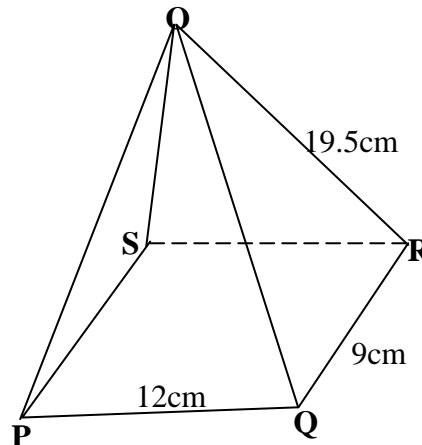
- Find:**
- the length of the projection of the line VP on the plane PQRS
 - the size of the angle between line VP and the plane PQRS
 - the size of the angle between plane VQR and PQRS

7. Mayoni Municipal Council wishes to construct a monument on the grounds. The monument is designed to be in the shape of a frustum of a right pyramid. The base of the frustum is a square of side 5.5 meters while the top of the frustum is a square of side 2.1 meters

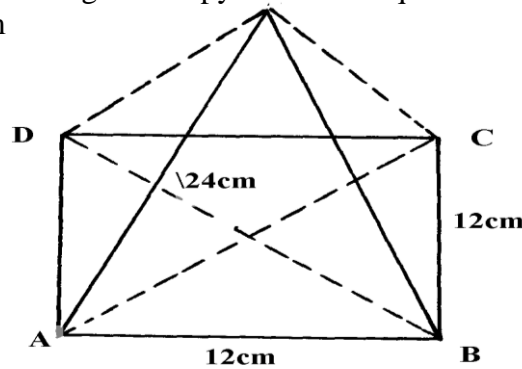


- If the perpendicular distance between faces ABCD and EFGH is 7cm;
- find the surface area of the monument frustum
 - The monument is to be painted on all surface excluding the base. Paint is sold in 4 litre tins each costing Kshs.640/=. It is estimated that an area 10m^2 is painted by $\frac{1}{2}$ litre of paint, find the cost of painting the monument.

8. The figure below is a pyramid of a rectangular base PQRS of length 12cm and width 9cm. The slanting edge has a length of 19.5cm



- (a) Determine the height of the pyramid
 (b) The angle PO makes with base PQRS
 (c) The angle POS makes with QOR
 (d) The volume of the pyramid
9. The diagram below shows a right solid pyramid on a square base ABCD of side 12cm and slanting height of 24cm



Calculate;

- a) To two decimal place the height (VO) of the pyramid
 b) the volume of the pyramid
 c) the total surface area of the pyramid
10. The base of a pyramid consists of a regular pentagon **ABCDE**, **4.5cm** a side. The vertex of the pyramid is **V** and **VA = VB = VC = VD = VE = 6.4cm**.
- (a) Sketch the general view of the pyramid
 (b) Calculate:
 (i) The angle between **VA** and the base
 (ii) The angle between face **VCD** and the base
11. The positions of two towns A and B on earth's surface are $(60^\circ\text{N}, 139^\circ\text{E})$ and $(60^\circ\text{N}, 41^\circ\text{W})$ respectively
- a) Find the difference in longitude between A and B
 b) Given that the radius of the earth is 6370km, calculate the distance between A and B in KM
 c) Another town C is 420km East of town B and on the same latitude A and B find the longitude of town C