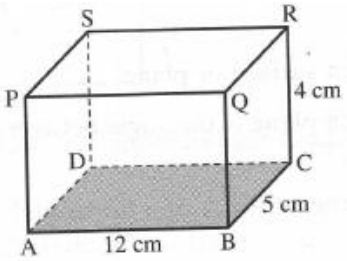
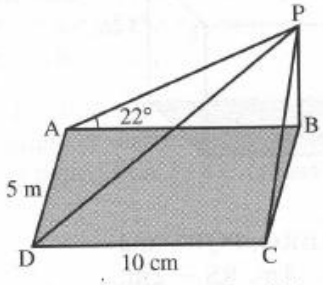
Problems involving 3-D Space

1. In the rectangular box shown, find:
(a) AC
(b) AR
(c) the angle between AC and AR.

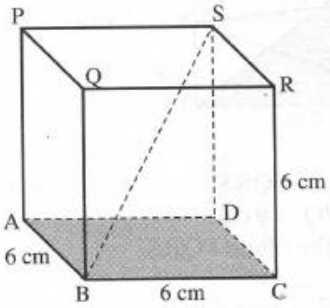


2. A vertical pole BP stands at one corner of a horizontal rectangular field as shown.

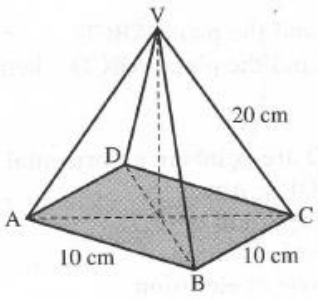


If AB = 10 m, AD = 5 m and the angle of elevation of P from A is 22°, calculate:
(a) the height of the pole
(b) the angle of elevation of P from C
(c) the length of a diagonal of the rectangle ABCD
(d) the angle of elevation of P from D.

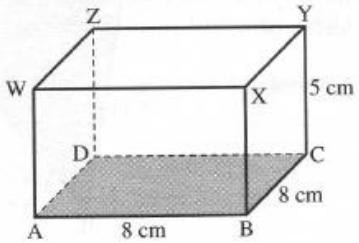
3. In the cube shown, find:
(a) BD
(b) AS
(c) BS
(d) the angle SBD.



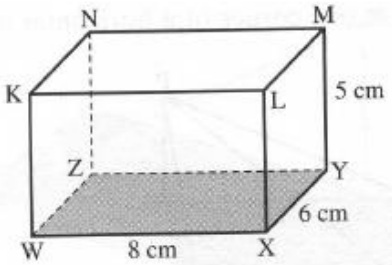
4. In the square-based pyramid shown, V is vertically above the middle of the base, AB = 10 cm and VC = 20 cm. Find:
(a) AC
(b) the height of the pyramid
(c) the angle between VC and the base ABCD.



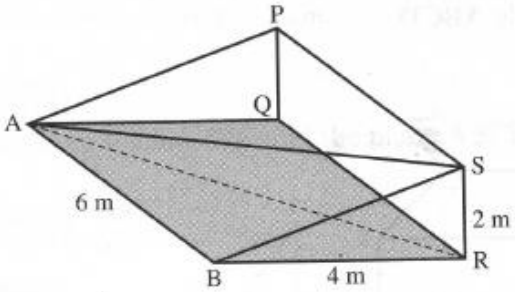
5. The figure shows a cuboid. Calculate:
(a) the lengths of AC and AY
(b) the angle between AY and the plane ABCD.



6. The figure shows a cuboid.
Calculate:
(a) the lengths ZX and KX
(b) the angle between NX and the plane WXYZ
(c) the angle between KY and the plane KLWX.



7. In the wedge shown, PQRS is perpendicular to ABRQ; PQRS and ABRQ are rectangles with AB = QR = 6 m, BR = 4 m, RS = 2 m.
Find:
(a) BS (b) AS
(c) the angle between AS and the plane ABRQ.



8. The pyramid VPQRS has a square base PQRS.
VP = VQ = VR = VS = 12 cm and PQ = 9 cm.
Calculate the angle between VP and the plane PQRS.

9. The pyramid VABCD has a rectangular base ABCD.
VA = VB = VC = VD = 15 cm, AB = 14 cm and BC = 8 cm.
Calculate:
(a) the angle between VB and the plane ABCD
(b) the angle between VX and the plane ABCD where X is the mid-point of BC.

10. In the diagram A, B and O are points in a horizontal plane and P is vertically above O, where OP = h m.
A is due West of O, B is due South of O and AB = 60 m. The angle of elevation of P from A is 25° and the angle of elevation of P from B is 33°.
(a) Find the length AO in terms of h.
(b) Find the length BO in terms of h.
(c) Find the value of h.