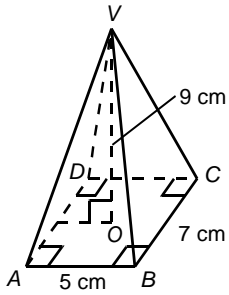


## Part 1 – Criterion A

### Levels 1-2

1. Find the volume of the following right pyramid.



2. Find the distance between  $A(-2, 7)$  and  $B(6, -4)$ .

### Levels 3-4

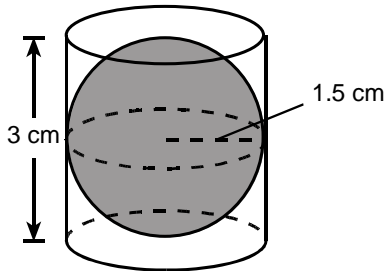
3. Find the surface area of a hemisphere of radius 9 cm.

4. If  $M(3, 3)$  is the mid-point of  $A(a, -2)$  and  $B(5, b)$ , find the values of  $a$  and  $b$ .

Levels 5-6

5. A sphere of radius 1.5 cm exactly fits into a cylindrical container of radius 1.5 cm and height 3 cm.

Find the volume of the empty space left inside the container. (Express your answer in terms of  $\pi$ .)



6. Find the equation of the straight line  $L$  passing through  $P(-1, 7)$  and perpendicular to the line  $L_1: 2x + y + 1 = 0$ .

Levels 7-8

7. Given three points  $P(k + 1, m + 1)$ ,  $Q(k, m - 2)$  and  $R(2k + 2, m + 3)$ . If  $PQ \perp PR$ , find the slope of  $QR$ .

8. The straight lines  $L_1 : 3x - (a + 2)y - 2 = 0$  and  $L_2 : -2x + ay + 3 = 0$  are **parallel** to each other.

a) Find the slope of  $L_1$  in terms of  $a$ .

b) Find the slope of  $L_2$  in terms of  $a$ .

c) Calculate the value of  $a$ .