10

V

D   C

Diagram **NOT**
accurately drawn
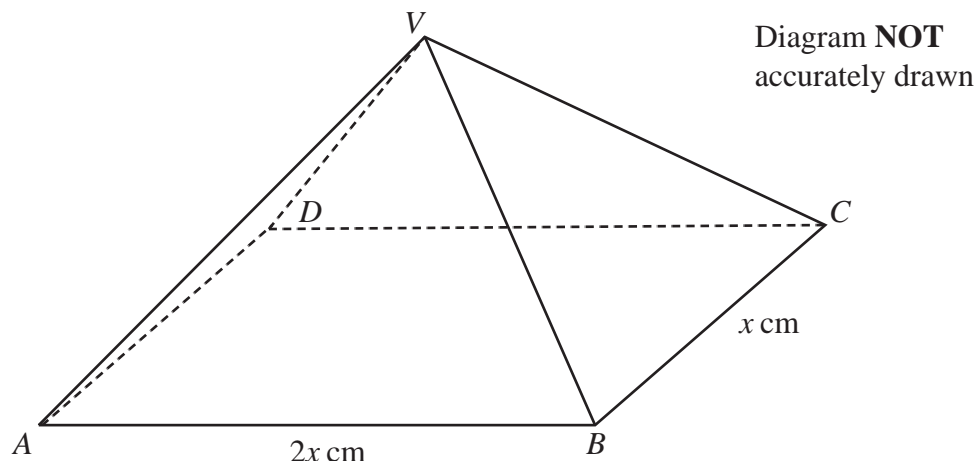
x cm

A $2x$ cm   B

Figure 4

Figure 4 shows a right pyramid $ABCDV$

The base of the pyramid is a rectangle where,

$$AB = DC = 2x \text{ cm} \quad AD = BC = x \text{ cm}$$

The edges VA, VB, VC and VD are all of equal length.

The angle between VA and $ABCD$ is 45°

(a) Show that $VA = \dfrac{\sqrt{10}}{2} x$ cm

(3)

(b) Find in cm, the exact height of the pyramid in terms of x

(2)

Find, in degrees to one decimal place,

(c) the size of angle VBA

(2)

(d) the size of the obtuse angle between the plane AVC and the plane BVD

(4)

Given that the volume of the pyramid is $9\sqrt{5}$ cm³

(e) find the value of x

(2)

....

....

....

Question 10 continued

Question 10 continued

P 7 4 2 8 5 R A 0 2 8 3 2

Question 10 continued

(Total for Question 10 is 13 marks)

P7 4 2 8 5 R A 0 2 9 3 2

11 (a) Using a formula on page 2 show that $\cos 2A = 2\cos^2 A - 1$

(2)

(b) Hence show that $\left(2\cos^2 A - 1\right)^2 = \dfrac{\cos 4A + 1}{2}$

(3)

The curve with equation $y = \dfrac{\sin 2x}{2} + \dfrac{\left(2\cos^2 x - 1\right)^2}{2} + \dfrac{1}{8}$ has a stationary point P in the range $0 \leqslant x \leqslant \dfrac{\pi}{6}$

(c) Find the exact coordinates of P

(7)

P 7 4 2 8 5 R A 0 3 0 3 2

Question 11 continued

P 7 4 2 8 5 R A 0 3 1 3 2

Question 11 continued

(Total for Question 11 is 12 marks)

TOTAL FOR PAPER IS 100 MARKS

P 7 4 2 8 5 R A 0 3 2 3 2