10 The roots of the equation $x^2 + 3x - 5 = 0$ are α and β.

(a) Without solving the equation, find

(i) the value of $\alpha^2 + \beta^2$

(ii) the value of $\alpha^4 + \beta^4$

(5)

Given that $\alpha > \beta$ and without solving the equation

(b) show that $\alpha - \beta = \sqrt{29}$

(2)

(c) Factorise $\alpha^4 - \beta^4$ completely.

(3)

(d) Hence find the exact value of $\alpha^4 - \beta^4$

(2)

Given that $\beta^4 = p + q\sqrt{29}$ where p and q are positive constants

(e) find the value of p and the value of q.

(3)

Question 10 continued

Question 10 continued

Question 10 continued

(Total for Question 10 is 15 marks)

11

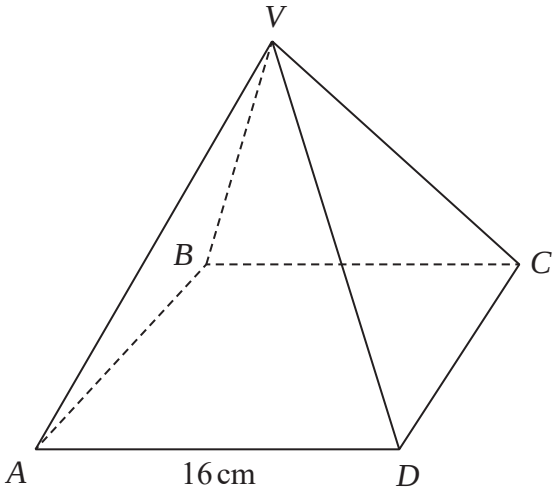

Diagram **NOT** accurately drawn

Figure 1

Figure 1 shows a right pyramid with vertex V and square base, $ABCD$, of side 16 cm.

The size of angle AVC is 90°

(a) Show that the height of the pyramid is $8\sqrt{2}$ cm.

(4)

(b) Find, in cm, the length of VA.

(3)

(c) Find, in cm, the exact length of the perpendicular from D onto VA.

(3)

Find, in degrees to one decimal place, the size of

(d) the angle between the plane VAB and the base $ABCD$,

(3)

(e) the obtuse angle between the plane VAB and the plane VAD.

(3)

Question 11 continued

Question 11 continued

(Total for Question 11 is 16 marks)

TOTAL FOR PAPER IS 100 MARKS