9 Given that α is the acute angle such that $\tan\alpha = \frac{2}{3}$

(a) find the exact value of $\cos\alpha$

(1)

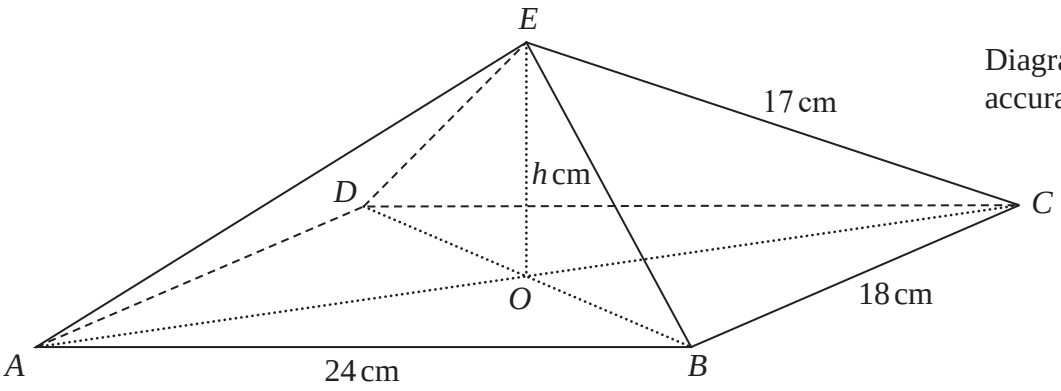

Diagram **NOT** accurately drawn

Figure 1

Figure 1 shows a right pyramid with a rectangular base $ABCD$ and vertex E

The rectangular base of the pyramid is horizontal with $AB = 24$ cm and $BC = 18$ cm.

The diagonals of the base intersect at the point O

The vertex E of the pyramid is vertically above O such that

$$AE = BE = CE = DE = 17 \text{ cm}$$

The height of the pyramid is h cm.

(b) Find the value of h

(3)

The size of the angle between the plane EBC and the plane $ABCD$ is $\theta°$

(c) Show that $\tan\theta° = \frac{2}{3}$

(2)

The point P is the midpoint of EB and the point Q is the midpoint of EC

(d) Find the size, in degrees to one decimal place, of the angle between the plane OPQ and the plane $BCQP$

(4)

Question 9 continued

Question 9 continued

Question 9 continued

(Total for Question 9 is 10 marks)