

- 10 The point  $A$  has coordinates  $(-6, -4)$  and the point  $B$  has coordinates  $(4, 1)$   
The line  $l$  passes through the point  $A$  and the point  $B$ .

(a) Find an equation of  $l$ .

(2)

The point  $P$  lies on  $l$  such that  $AP:PB = 3:2$

(b) Find the coordinates of  $P$ .

(2)

The point  $Q$  with coordinates  $(m, n)$  lies on the line through  $P$  that is perpendicular to  $l$ .

Given that  $m < 0$  and that the length of  $PQ$  is  $3\sqrt{5}$

(c) find the coordinates of  $Q$ .

(5)

The point  $R$  has coordinates  $(-13, 0)$

(d) Show that

(i)  $AB$  and  $RQ$  are equal in length,

(ii)  $AB$  and  $RQ$  are parallel.

(4)

(e) Find the area of the quadrilateral  $ABQR$ .

(2)

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**Question 10 continued**

Area for writing answers to Question 10 continued.



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**Question 10 continued****(Total for Question 10 is 15 marks)**

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11

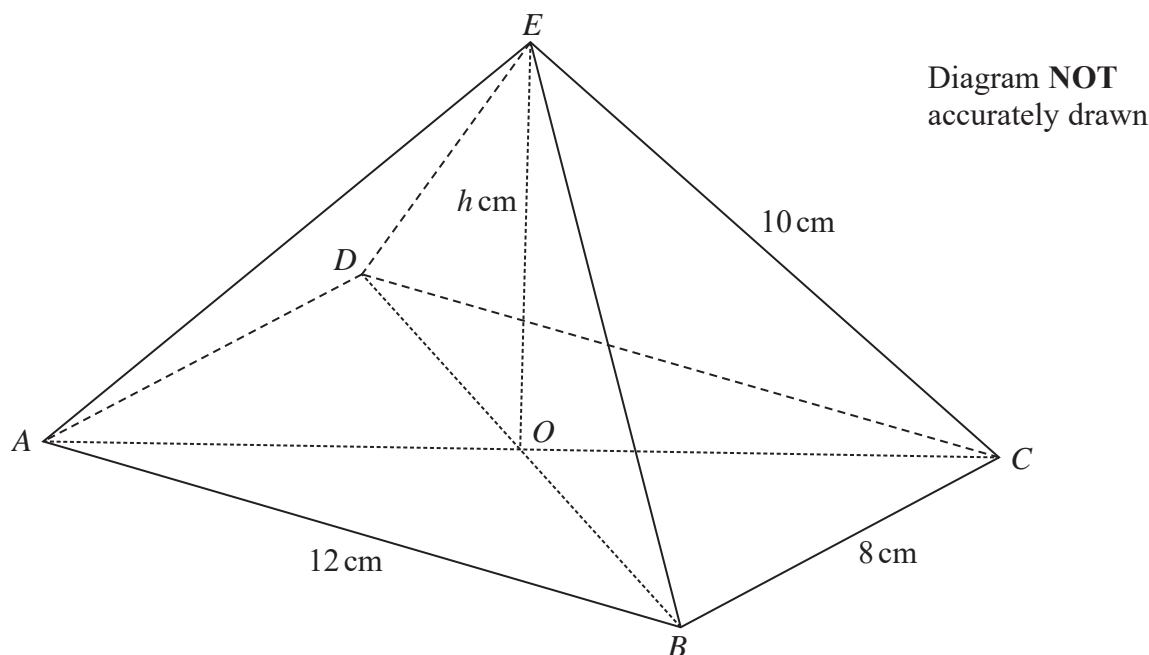


Figure 6

A pyramid with a rectangular base  $ABCD$  and vertex  $E$  is shown in Figure 6.

The rectangular base is horizontal with  $AB = 12$  cm and  $BC = 8$  cm.

The diagonals of the base intersect at the point  $O$ .

The vertex  $E$  of the pyramid is vertically above  $O$ .

The height of the pyramid is  $h$  cm and  $AE = BE = CE = DE = 10$  cm.

(a) Show that  $h = 4\sqrt{3}$  (3)

(b) Find, in degrees to 1 decimal place, the size of angle  $OCE$ . (2)

The angle between  $OE$  and the plane  $CBE$  is  $\theta^\circ$

(c) Show that  $\cos \theta^\circ = \frac{2\sqrt{7}}{7}$  (3)

The point  $P$  is the midpoint of  $BE$  and the point  $Q$  is the midpoint of  $CE$ .

(d) Find, in degrees to 1 decimal place, the size of the angle between the plane  $OPQ$  and the plane  $EPQ$ . (4)



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**Question 11 continued**

Handwriting practice area with horizontal dotted lines.



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**Question 11 continued**

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**(Total for Question 11 is 12 marks)**

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**TOTAL FOR PAPER IS 100 MARKS**