PART 2 (Questions 11 to 15) (75 marks)

Question 11 (15 marks)

The points A(3, 1, -1), B(0, 2, 10), and C(0, 0, 6) are on the plane P.

(a) (i) Find \overrightarrow{AB} .

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(1 mark)

(ii) Find $\overrightarrow{AB} \times \overrightarrow{AC}$.

⁽¹ mark)

(iii) Show that the equation of *P* is 3x - 2y + z = 6.

(2 marks)

(b) (i) Find the equation of the normal to *P* through the point D(6, -1, 0).

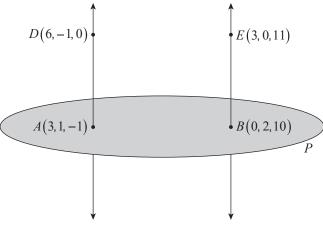


(2 marks)

(ii) Show that the normal found in part (b)(i) intersects P at A(3, 1, -1).

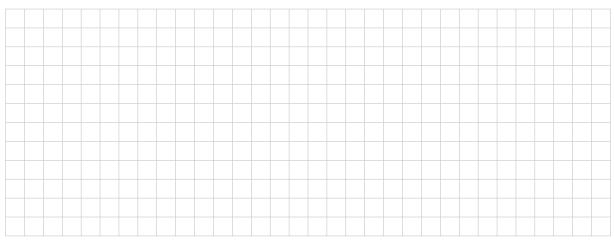


(c) Figure 11 shows the point E(3, 0, 11) on the normal to P through B(0, 2, 10).





(i) Show that the line through D and E is parallel to P.



(2 marks)

(ii) Find the distance from this line to P.

(1 mark)

(d) (i) Show that the point F(-3, 2, 5) is the same distance from *P* as the line that passes through *D* and *E* is from *P*.

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(2 marks)

(ii) Is F on the line through D and E? Explain your answer.

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(2 marks)