

<b>KNOW</b>	<b>/ 10</b>	<b>APP</b>	<b>/ 10</b>	<b>INQ</b>	<b>/ 10</b>	<b>COMM</b>	<b>/ 5</b>
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**MCV4U1 - UNIT 8 – REPRESENTING LINES AND PLANES**  
**TEST**

- 1) For the line that passes through the points A(5, 8, -2) and B(-1, 3, 5), find
- a) a vector equation. (*K – 2 marks*)
  
  
  
  
  
  
  
  
  
  
  - b) parametric equations. (*K – 1 mark*)
- 2) Determine if and how the following lines intersect. If they intersect at a single point, find the point of intersection. (*K - 4 marks*)

$$L_1: \frac{x-1}{4} = \frac{2-y}{5} = \frac{3-z}{1}$$

$$L_2: \frac{x-4}{1} = \frac{y}{-3} = \frac{3-z}{1}$$

- 3) Determine if and how the following line and plane intersect. If they intersect at a single point, determine the point of intersection. (*K* – 3 marks)

Line:  $(x, y, z) = (4, -2, 3) + t(-1, 0, 9)$

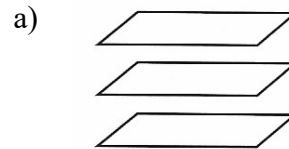
Plane:  $4x - 3y - z + 7 = 0$

- 4) The lines  $(x, y, z) = (-3, 8, 1) + s(1, -1, 1)$  and  $(x, y, z) = (1, 4, 2) + t(-3, k, 8)$  intersect at a point.  
a) Determine the value of  $k$ . (*A* – 2 marks)

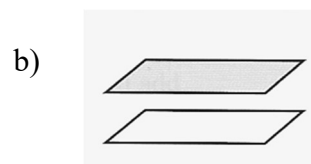
- b) Determine the coordinates of the point of intersection. (*A* – 3 marks)

- 5) For each of the following sets of three planes, determine (by inspection) which diagram describes the intersection of the planes. Write the corresponding letter in the blank space provided. (A – 5 marks)

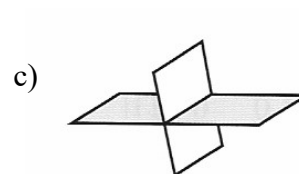
\_\_\_\_\_  $\pi_1: x + 2y + 3z - 4 = 0$   
 $\pi_2: 3x + 6y + 9z - 12 = 0$   
 $\pi_3: 5x + 10y + 15z - 20 = 0$



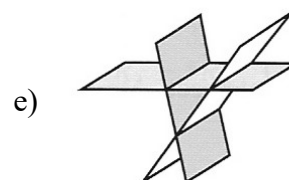
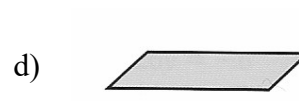
\_\_\_\_\_  $\pi_1: x + 2y + 3z - 4 = 0$   
 $\pi_2: 3x + 6y + 9z - 11 = 0$   
 $\pi_3: 5x + 10y + 15z - 16 = 0$



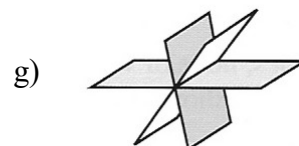
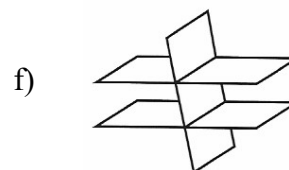
\_\_\_\_\_  $\pi_1: x + 2y + 3z - 4 = 0$   
 $\pi_2: 3x + 6y + 9z - 12 = 0$   
 $\pi_3: 5x + 10y + 15z - 16 = 0$



\_\_\_\_\_  $\pi_1: x + 2y + 3z - 4 = 0$   
 $\pi_2: 3x + 6y + 9z - 12 = 0$   
 $\pi_3: 3x + 5y - 2z - 1 = 0$



\_\_\_\_\_  $\pi_1: x + 2y + 3z - 4 = 0$   
 $\pi_2: 3x + 6y + 9z - 11 = 0$   
 $\pi_3: 3x + 5y - 2z - 1 = 0$



6) A plane contains the points A(5, -2, 9), B(-3, 0, 6) and C(4, 1, -2).

a) Find a vector equation for the plane. (*1 – 3 marks*)

b) Find a scalar equation for the plane. (*1 – 3 marks*)

7) Determine if and how the following planes intersect. If they intersect along a line, find the parametric equations of the line of intersection. (*1 – 4 marks*)

$$\pi_1: 3x - y + 4z - 7 = 0$$

$$\pi_2: x + y - 2z + 5 = 0$$

- 8) Determine if and how the following planes intersect. If they intersect at a single point, determine the point of intersection. If they intersect along a **single** line, find the parametric equations of the line of intersection. Otherwise, just state the nature of the intersection.  
(*C* – 5 marks)

$$\pi_1: 3x - 3y - 2z - 14 = 0$$

$$\pi_2: 5x + y - 6z - 10 = 0$$

$$\pi_3: x - 2y + 4z - 9 = 0$$