

## A2 Maths Test $\tau$ (tau) Version O

- 1)  $xy = \sin^2 y$ . Find  $\frac{dy}{dx}$
- 2) The line  $l_1$  passes through the points A and B with position vectors  $3\mathbf{i} - 6\mathbf{j} + 8\mathbf{k}$  and  $2\mathbf{i} + 3\mathbf{j} - \mathbf{k}$  respectively, relative to a fixed origin.
  - a) Find a vector equation for  $l_1$ .  
The line  $l_2$  has vector equation  $r = (-17\mathbf{j} + 15\mathbf{k}) + \mu(2\mathbf{i} + \mathbf{j} + \mathbf{k})$
  - b) Show that the lines  $l_1$  and  $l_2$  intersect and state the value of  $\mu$
  - c) Find the co-ordinates of the point where  $l_1$  and  $l_2$  intersect.  
The point C lies on  $l_2$  and is such that AC is perpendicular to AB
  - d) Find the position vector of C.

## A2 Maths Test $\tau$ (tau) Version P

- 1)  $\tan(2x + y) = x$  Find  $\frac{dy}{dx}$
- 2) The line  $l_1$  passes through the points A and B with position vectors  $\mathbf{i} - 6\mathbf{j} + 8\mathbf{k}$  and  $\mathbf{i} + 3\mathbf{j} - \mathbf{k}$  respectively, relative to a fixed origin.
  - a) Find a vector equation for  $l_1$ .  
The line  $l_2$  has vector equation  $r = (5\mathbf{i} + 27\mathbf{j} - 17\mathbf{k}) + \mu(2\mathbf{i} + 3\mathbf{j} + \mathbf{k})$
  - b) Show that the lines  $l_1$  and  $l_2$  intersect and state the value of  $\mu$
  - c) Find the co-ordinates of the point where  $l_1$  and  $l_2$  intersect.  
The point C lies on  $l_2$  and is such that AC is perpendicular to AB
  - d) Find the position vector of C.

## A2 Maths Test $\tau$ (tau) Version Q

- 1)  $e^{xy} = 4$  Find  $\frac{dy}{dx}$
- 2) The line  $l_1$  passes through the points A and B with position vectors  $\mathbf{i} - \mathbf{j} + \mathbf{k}$  and  $2\mathbf{i} + \mathbf{j} - \mathbf{k}$  respectively, relative to a fixed origin.
  - a) Find a vector equation for  $l_1$ .  
The line  $l_2$  has vector equation  $r = (-8\mathbf{i} + 4\mathbf{j} - 4\mathbf{k}) + \mu(2\mathbf{i} - \mathbf{j} + \mathbf{k})$
  - b) Show that the lines  $l_1$  and  $l_2$  intersect and state the value of  $\mu$
  - c) Find the co-ordinates of the point where  $l_1$  and  $l_2$  intersect.  
The point C lies on  $l_2$  and is such that AC is perpendicular to AB
  - d) Find the position vector of C.

## A2 Maths Test $\tau$ (tau) Version R

- 1)  $xy = \sin^2 y \cos^2 x$ . Find  $\frac{dy}{dx}$
- 2) The line  $l_1$  passes through the points A and B with position vectors  $8\mathbf{k}$  and  $2\mathbf{i}$  respectively, relative to a fixed origin.
  - a) Find a vector equation for  $l_1$ .  
The line  $l_2$  has vector equation  $r = 5\mathbf{i} + 15\mathbf{j} + 13\mathbf{k} + \mu(\mathbf{i} + 3\mathbf{j} + \mathbf{k})$
  - b) Show that the lines  $l_1$  and  $l_2$  intersect and state the value of  $\mu$
  - c) Find the co-ordinates of the point where  $l_1$  and  $l_2$  intersect.  
The point C lies on  $l_2$  and is such that AC is perpendicular to AB
  - d) Find the position vector of C.
  - e) Explain the connection between your answer to c) and your answer to d)

**Answers****Version O**

1)  $\frac{y}{\sin 2y - x}$

2) a)  $\mathbf{r} = 3\mathbf{i} - 6\mathbf{j} + 8\mathbf{k} + \lambda(-\mathbf{i} + 9\mathbf{j} - 9\mathbf{k})$

b)  $\mu = 2$

c) (4, -15, 17)

d)  $(-159, -\frac{193}{2}, -\frac{129}{2})$

**Version P**

1)  $\cos^2(2x + y) - 2$

2) a)  $\mathbf{r} = \mathbf{i} - 6\mathbf{j} + 8\mathbf{k} + \lambda(9\mathbf{j} - 9\mathbf{k})$

b)  $\mu = -2$

c) (1, 21, -19)

d) (-53, -60, -46)

**Version Q**

1)  $-\frac{y}{x}$

2) a)  $\mathbf{r} = \mathbf{i} - \mathbf{j} + \mathbf{k} + \lambda(\mathbf{i} + 2\mathbf{j} - 2\mathbf{k})$

b)  $\mu = \frac{23}{5}$

c)  $(\frac{6}{5}, -\frac{3}{5}, \frac{3}{5})$

d)  $(3, -\frac{3}{2}, \frac{3}{2})$

**Version R**

1)  $\frac{y + \sin^2 y \sin 2x}{\sin 2y \cos^2 x - x}$

2) a)  $\mathbf{r} = 8\mathbf{k} + \lambda(2\mathbf{i} - 8\mathbf{k})$

b)  $\mu = -5$

c) (0, 0, 8)

d) (0, 0, 8)