Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Block:\_\_\_\_\_\_

**IB MATH SL: IB-Style Practice Questions**

**Vectors**

**Paper 1 –** [Maximum mark: 5]

1. In the following diagram, $ →$**, = p,** $→$**, = q** and $→$**, =** $\frac{1}{2}$$→$.

 P

T

 O Q

 Express each of the following vectors in terms of **p** and **q**,

1. $→$ (2)
2. $→$ (3)

**Paper 2 –** [Maximum mark: 6]

1. The following diagram shows two perpendicular vectors ***u*** and ***v***.

***u***

***v***

1. Let ***w*** = ***u*** – ***v.*** Represent ***w*** on the diagram above. (2)
2. Given that ***u =*** $\left(\begin{matrix}3\\2\\1\end{matrix}\right) $and ***v =*** $\left(\begin{matrix}5\\n\\3\end{matrix}\right)$,where *n* $\in Z$, find *n*. (4)

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Block:\_\_\_\_\_\_

**IB MATH SL: IB-Style Practice Questions**

**Vectors**

**Paper 1 –** [Maximum mark: 17]

3. The line L1 passes through the points A(2, 1, 4) and B (1, 1, 5).

(a) Show that $→$ = $\left(\begin{matrix}-1\\ 0\\ 1\end{matrix}\right)$ **.** [1]

(b) Hence, write down

(i) a direction vector for L1;

(ii) a vector equation for L1 .. [3]

Another line L2 has the equation ***r =*** $\left( \begin{matrix} 4\\ 7\\-4\end{matrix} \right)$ ***+ s*** $\left(\begin{matrix} 0\\-1\\ 1\end{matrix}\right)$. The lines L1 and L2 intersect at point P.

(c) Find the coordinates of P. [6]

(d) (i) Write down a direction vector for L2.

 (ii) Hence, find the angle between L1 and L2. [7]

**Paper 2 –** [Maximum mark: 17]

4. Consider the lines L1 and L2 with the equations L1: ***r =*** $\left( \begin{matrix} 11\\ 8\\ 2\end{matrix} \right)$ ***+ s*** $\left(\begin{matrix} 4\\ 3\\-1\end{matrix}\right)$ and L2 : ***r =*** $\left( \begin{matrix} 1\\ 1\\-7\end{matrix} \right)$ ***+t*** $\left(\begin{matrix} 2\\ 1\\11\end{matrix}\right)$

 The lines intersect at point P.

 (a) Find the coordinates of point P. [6]

 (b) Show that the lines are perpendicular. [5]

 (c) The point Q (7, 5, 3) lies on L1. The point R is the reflection of Q in the line L2.

 Find the coordinates of R. [6]