Ans. key

Math 2551 A1 A2 A3 Exercise 2

Section:
Name:
Student Number:

(1) Let $\mathbf{r}$ be a point on the line passing two points $\mathbf{A} = (1, 2, 1)$ and $\mathbf{B} = (2, 1, -1)$, then $\mathbf{r}$ satisfies

✓ (a) $\mathbf{r} - \mathbf{A} = t(\mathbf{B} - \mathbf{A})$, for some $t \in (-\infty, \infty)$;

(b) $\mathbf{r} = t(\mathbf{A} - \mathbf{B})$, for some $t \in (-\infty, \infty)$;

(2) A plane passes points $\mathbf{A} = (1, 2, 1)$, $\mathbf{B} = (2, 1, -1)$ and $\mathbf{C} = (0, 0, 1)$, which vector is perpendicular to the plane ?

(a) $(\mathbf{A} \times \mathbf{C})$;

✓ (b) $(\mathbf{A} - \mathbf{B}) \times (\mathbf{C} - \mathbf{B})$;

(1) The line equation is $\vec{r}$ - (a point on the line)
= t (a vector // to the line).
Therefore only (a) satisfies the line equation, and (b) is missing a point on the line.

(2) Since A-B and C-B are // to the plane, (A-B)x(C-B) gives a normal vector. On the orther hand, A or C is not // to the plane (even though their terminal points lie on the plane).