Ans. Key

Math 2551 Exercise 1

Section:
Name:
Student Number:

Pick one correct answer for each problem.

Vector $\mathbf{u}$ goes from $\mathbf{A}(1,2,1)$ to $\mathbf{B}(2,1,-1)$, and vector $\mathbf{v}$ goes from $\mathbf{C}(2,1,-1)$ to $\mathbf{D}(3,0,-3)$, then

✓ (a) $\mathbf{u} = \mathbf{v}$;
(b) $\mathbf{u} \neq \mathbf{v}$;

$u = (2,1,-1) - (1,2,1)$
$= (1,-1,-2)$
$v = (3,0,-3) - (2,1,-1) = (1,-1,-2)$
$\therefore u = v$

Let $\overline{\mathbf{AB}}$ be a line passing $\mathbf{A}(1,2,1)$ and $\mathbf{B}(2,1,-1)$, which point is on $\overline{\mathbf{AB}}$?

(a) $(1,2,1) + (2,1,-1)$;
(b) $(1,2,1) - (2,1,-1)$;
✓ (c) $\frac{1}{2}(1,2,1) + \frac{1}{2}(2,1,-1)$;
or ✓ (d) $\frac{3}{2}(1,2,1) - \frac{1}{2}(2,1,-1)$;

Any pt on the line passing A & B can ~~be~~ written as

$\alpha(1,2,1) + (1-\alpha)(2,1,-1)$.

Therefore (C) is the case with $\alpha = \frac{1}{2}$. The pt is actually on the line segment connecting A & B. (d) is the case with $\alpha = \frac{3}{2}$, and the point is still on the line. Since $\alpha \notin [0,1]$, the point doesn't lie between A & B.

An easy way to check is add the two coefficients. If the sum is 1, the point can be written in the form of $\alpha(1,2,1) + (1-\alpha)(2,1,-1)$.