QUESTION Which of the following sets of vector are subspaces of $\mathbf{R}^3$? Give reasons.

(a) all vectors of the form $(v, 0, 0)$;

(b) all vectors of the form $(v, 1, 1)$;

(c) all vectors of the form (u, v, w) where $v = u + w$.

ANSWER

(a) Yes - both closure axioms hold.

(b) No - the set is not closed under addition: $2(v, 1, 1)$ is not in the set, for example. Alternatively $(0, 0, 0)$ is not in the set.

(c) Yes.