

沒有星號題的答案見課本後面

Section 1-1

課本 problem 23, 35, 37, 39, 41*

41

$$\begin{aligned}
 \text{a) } r(\mathbf{v} + \mathbf{w}) &= r([v_1, \dots, v_n] + [w_1, \dots, w_n]) \\
 &= r[v_1 + w_1, \dots, v_n + w_n] \\
 &= [r(v_1 + w_1), \dots, r(v_n + w_n)] \\
 &= [rv_1 + rw_1, \dots, rv_n + rw_n] \\
 &= [rv_1, \dots, rv_n] + [rw_1, \dots, rw_n] \\
 &= r[v_1, \dots, v_n] + r[w_1, \dots, w_n] \\
 &= r\mathbf{v} + r\mathbf{w} \\
 \text{b) } r(s\mathbf{v}) &= r(s[v_1, \dots, v_n]) = r[sv_1, \dots, sv_n] \\
 &= [r(sv_1), \dots, r(sv_n)] = [(rs)v_1, \dots, (rs)v_n] \\
 &= rs[v_1, \dots, v_n] = (rs)\mathbf{v} \\
 \text{c) } 1\mathbf{v} &= 1[v_1, \dots, v_n] = [1v_1, \dots, 1v_n] = [v_1, \dots, v_n] = \mathbf{v}
 \end{aligned}$$

Section 1-2

課本 problem 5, 11, 15, 29, 39, 40*, 44*

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44 We know that \vec{w} is perpendicular to both \vec{u} and \vec{v} , so $\vec{w} \cdot \vec{u} = 0$ and $\vec{w} \cdot \vec{v} = 0$. Then

$$\begin{aligned}
 \vec{w} \cdot (r\vec{u} + s\vec{v}) &= \vec{w} \cdot (r\vec{u}) + \vec{w} \cdot (s\vec{v}) \\
 &= r(\vec{w} \cdot \vec{u}) + s(\vec{w} \cdot \vec{v}) \\
 &= r(0) + s(0) = 0
 \end{aligned}$$

Therefore \vec{w} is perpendicular to $r\vec{u} + s\vec{v}$