沒有星號題的答案見課本後面

Section 1-4

課本 proble 9

Section 1-5

課本 proble 7, 11, 14*, 19, 23, 26*, 29

14

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \end{bmatrix} = \begin{bmatrix} -7 & 5 & 3 \\ 3 & -2 & -2 \\ 3 & -2 & -1 \end{bmatrix} \begin{bmatrix} 5 \\ 3 \\ 8 \end{bmatrix} = \begin{bmatrix} 4 \\ -7 \\ 1 \end{bmatrix}$$

26 Let B be a matrix such that $A^2B = BA^2 = I$. Then $A(AB) = (BA)A = I$, so A is invertible and $A^{-1} = BA = AB$.

Section 1-6

課本 proble 8*, 11*

8

Let $P = \{[2x, x + y, y] \mid x, y \in \mathbb{R}\}$ which is a nonempty subset of $\mathbb{R}^3$. Let $\mathbf{v} = [2a, a + b, a]$ and $\mathbf{w} = [2c, c + d, d]$ be in P. Then

$$\begin{aligned} \mathbf{v} + \mathbf{w} &= [2a + 2c, a + b + c + d, b + d] \\ &= [2(a + c), (a + c) + (b + d), b + d] \end{aligned}$$

which has the form $[2x, x + y, y]$ and is in P. Also

$$r[2a, a + b, b] = [2ra, ra + rb, rb]$$

which is in P. Thus P is a subspace of $\mathbb{R}^3$.

11

$W = \{[x, mx] \mid x \in \mathbb{R}\}$ is nonempty since $[0, 0] \in W$. Let $[x_1, mx_1]$ and $[x_2, mx_2]$ be in W. Then $[x_1, mx_1] + [x_2, mx_2] = [x_1 + x_2, mx_1 + mx_2] = [(x_1 + x_2), m(x_1 + x_2)] \in W$. Also $r[x_1, mx_1] = [rx_1, rmx_1] = [rx_1, m(rx_1)] \in W$ for any scalar r. Thus W is nonempty and closed under addition and scalar multiplication, so it is a subspace of $\mathbb{R}^2$.