- **1.** Explain why  $S = \{(-4, 5), (0, 0)\}$  is **not** a basis for  $\mathbb{R}^2$
- **2.** Explain why  $S = \{(1, 2), (1, 0), (0, 1)\}$  is **not** a basis for  $\mathbb{R}^2$
- **3.** Explain why  $S = \{(1, 3, 0), (4, 1, 2), (-2, 5, -2)\}$  is **not** a basis for  $\mathbb{R}^3$
- **4.** Explain why  $S = \{(7, 0, 3), (8, -4, 1)\}$  is **not** a basis for  $\mathbb{R}^3$
- **5.** Explain why  $S = \{1, 2x, -4 + x^2, 5x\}$  is **not** a basis for  $\mathbb{P}_2$
- **6.** Explain why  $S = \left\{ \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix} \right\}$  is **not** a basis for  $M_{2 \times 2}$
- 7. Determine whether the set  $S = \{(4, -3), (5, 2)\}$  is a basis for  $\mathbb{R}^2$
- **8.** Determine whether the set  $S = \{(1, 5, 3), (0, 1, 2), (0, 0, 6)\}$  is a basis for  $\mathbb{R}^3$
- **9.** Determine whether the set  $S = \{(0, 3, -2), (4, 0, 3), (-8, 15, -16)\}$  is a basis for  $\mathbb{R}^3$
- **10.** Determine whether the set  $S = \{1 2t^2 + t^3, -4 + t^2, 2t + t^3, 5t\}$  is a basis for  $\mathbb{P}_3$
- **11.** Determine whether the set  $S = \left\{ \begin{pmatrix} 2 & 0 \\ 0 & 3 \end{pmatrix}, \begin{pmatrix} 1 & 4 \\ 0 & 1 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 3 & 2 \end{pmatrix}, \begin{pmatrix} 0 & 1 \\ 2 & 0 \end{pmatrix} \right\}$  is a basis for  $M_{2,2}$