## Reading Questions 14

## page 463: definition a.9

- 1. The cross product  $\vec{v} \times \vec{w}$  is a unit vector.
- 2. If  $\vec{u}$  is orthogonal to  $\vec{v}$  and  $\vec{w}$  then  $\vec{u} = \vec{v} \times \vec{w}$ .
- 3. Give a vector in  $\mathbb{R}^4$  which is orthogonal to both  $\vec{e}_1$  and  $\vec{e}_2$ .

## Section 6.1 Introduction to determinants (Part 1)

## **Cross Product**

**P** 1. Write down the formula for the determinant of a  $3 \times 3$  matrix.

**P 2.** If the  $3 \times 3$  matrix A is not invertible then the determinant of A is \_\_\_\_\_.

- **P** 3. If the  $3 \times 3$  matrix A is not invertible then the dimension of the image of A is \_\_\_\_\_.
- **P** 4. Compute the determinant for the follow matrices.

$$A = \begin{bmatrix} 0 & 1 & 1 \\ 3 & 2 & 1 \\ 1 & 0 & 1 \end{bmatrix} \quad B = \begin{bmatrix} 3 & 2 & 1 \\ 0 & 1 & 1 \\ 1 & 0 & 1 \end{bmatrix} \quad C = \begin{bmatrix} 0 & 2 & 2 \\ 3 & 2 & 1 \\ 1 & 0 & 1 \end{bmatrix} \quad D = \begin{bmatrix} 0 & 1 & 1 \\ 3 & 2 & 1 \\ 1 & 1 & 2 \end{bmatrix}$$

**P** 5. Compare det(A), det(B), det(C) and det(D).