

# Tutorial answer sheet – Vectors

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1. (a) scalar;  
(b) scalar;  
(c) scalar;  
(d) vector;  
(e) vector;  
(f) scalar;  
(g) vector.
2.  $\begin{bmatrix} 6.10N \\ 11.48N \end{bmatrix}$
3. (a)  $\sqrt{58}$ ;  
(b) 17;  
(c) 3;  
(d)  $\sqrt{13}$ ;  
(e)  $\sqrt{13}$ ;  
(f)  $\sqrt{13}$ .
4. -6.
5. -50.
6.  $39^\circ$ .
7.  $\frac{17}{\sqrt{26}} = 3.334$ .
8. 4,  $63.4^\circ$ .
9.  $\begin{bmatrix} 0 \\ 0 \\ -2 \end{bmatrix}$
10.  $\begin{bmatrix} -4 \\ 59 \\ 26 \end{bmatrix}$
11. (a)  $\mathbf{a} \cdot \mathbf{b} = 27$ ,  $\mathbf{b} \cdot \mathbf{a} = 27$ ,  $\mathbf{a} \cdot \mathbf{a} = 29$ ,  $\mathbf{b} \cdot \mathbf{b} = 13$ ,  $\mathbf{a} \times \mathbf{b} = \begin{bmatrix} 35 \\ -40 \\ -10 \end{bmatrix}$ , and  $\mathbf{b} \times \mathbf{a} = \begin{bmatrix} -35 \\ 40 \\ 10 \end{bmatrix}$ ;  
(b)  $\mathbf{a} \cdot \mathbf{b} =$ ,  $\mathbf{b} \cdot \mathbf{a} =$ ,  $\mathbf{a} \cdot \mathbf{a} =$ ,  $\mathbf{b} \cdot \mathbf{b} =$ ,  $\mathbf{a} \times \mathbf{b} = \begin{bmatrix} -59 \\ -10 \\ 22 \end{bmatrix}$ , and  $\mathbf{b} \times \mathbf{a} = \begin{bmatrix} 59 \\ 10 \\ -22 \end{bmatrix}$ ;