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. $39°$.
7. $\frac{17}{\sqrt{26}} = 3.334$.
8. 4, $63.4°$.
9. $\begin{bmatrix} 0 \\ 0 \\ -2 \end{bmatrix}$
10. $\begin{bmatrix} -4 \\ 59 \\ 26 \end{bmatrix}$
11. (a) $\mathbf{a} \cdot \mathbf{b} = 27$, $\mathbf{b} \cdot \mathbf{a} = 27$, $\mathbf{a} \cdot \mathbf{a} = 29$, $\mathbf{b} \cdot \mathbf{b} = 126$, $\mathbf{a} \times \mathbf{b} = \begin{bmatrix} 35 \\ -40 \\ -10 \end{bmatrix}$, and $\mathbf{b} \times \mathbf{a} = \begin{bmatrix} -35 \\ 40 \\ 10 \end{bmatrix}$;
    (b) $\mathbf{a} \cdot \mathbf{b} = -50$, $\mathbf{b} \cdot \mathbf{a} = -50$, $\mathbf{a} \cdot \mathbf{a} = 29$, $\mathbf{b} \cdot \mathbf{b} = 201$, $\mathbf{a} \times \mathbf{b} = \begin{bmatrix} 53 \\ 6 \\ 22 \end{bmatrix}$, and $\mathbf{b} \times \mathbf{a} = \begin{bmatrix} -53 \\ -6 \\ -22 \end{bmatrix}$.