ANSWERS to Lecture 4 problems (*Vectors 2*)

1. (a) OUT (b) OUT (c) IN (d) OUT

2. $\sqrt{14}$ $\sqrt{69}$ $\sqrt{41}$

3. (a) $\hat{\mathbf{a}} = \dfrac{\mathbf{A}}{\sqrt{14}} = \dfrac{2}{\sqrt{14}}\mathbf{i} + \dfrac{1}{\sqrt{14}}\mathbf{j} - \dfrac{3}{\sqrt{14}}\mathbf{k}$

   (b) $\hat{\mathbf{c}} = \dfrac{\mathbf{C}}{\sqrt{41}} = \dfrac{4}{\sqrt{41}}\mathbf{i} + \dfrac{5}{\sqrt{41}}\mathbf{k}$

   (c) If $\mathbf{D} = \mathbf{A} + \mathbf{B} = 9\mathbf{i} - \mathbf{j} + \mathbf{k}$, then $\hat{\mathbf{d}} = \dfrac{\mathbf{D}}{\sqrt{83}} = \dfrac{9}{\sqrt{83}}\mathbf{i} - \dfrac{1}{\sqrt{83}}\mathbf{j} + \dfrac{1}{\sqrt{83}}\mathbf{k}$

4. (a) 0 (b) 48 (c) -7

5. (a) $\mathbf{A} \times \mathbf{B} = -2\mathbf{i} - 29\mathbf{j} - 11\mathbf{k}$

   (b) $\mathbf{C} \times \mathbf{B} = 10\mathbf{i} + 19\mathbf{j} - 8\mathbf{k}$

   (c) $\mathbf{A} \times \mathbf{C} = 5\mathbf{i} - 22\mathbf{j} - 5\mathbf{k}$

6. (a) 90° (b) 0.445 rad = 25.5° (c) 1.867 rad = 107.0°

7. (a) OUT (b) IN (c) OUT (d) result is 0 (no direction)