SCI 113 Spring 2008
Answers exercises LN chapter 6, and book Chapter 10

Note: A vector will be denoted in bold space, and the coordinates will be given as a row vector for convenience.

(1) LN 6.51: (2) $(31, 11, -20)$, (4) $(80, 56, -72)$.

(2) LN 6.52: (1) $\sqrt{26}$, (2) $\sqrt{6}$, (4) $\sqrt{122}$, (6) $\left(\dfrac{-2}{\sqrt{14}}, \dfrac{-1}{\sqrt{14}}, \dfrac{3}{\sqrt{14}} \right)$,

(10) $\theta = \cos^{-1}\left(\dfrac{3}{\sqrt{156}} \right)$, (13) $y = \dfrac{-43}{3}$, (14) any vector of the form $(t, -t, t)$, where t is a non-zero real number. In particular, if we take $t = 1$ we get the vector $(1, -1, 1)$ which is perpendicular to vectors $\mathbf{u}$ and $\mathbf{v}$.

(3) LN 6.53: (1) $x + y = 3$.

(4) LN 6.54: (1) $x + y = 1$.

(5) Book 10.14: $\theta = \cos^{-1}\left(\dfrac{-1}{3\sqrt{3}} \right)$. Any vector of the form $\left(\dfrac{-t}{3}, \dfrac{4t}{3}, t \right)$ with t a real number is perpendicular (orthogonal) to vectors $\mathbf{a}$ and $\mathbf{b}$. In particular, if we take $t = 3$, we get the vector $(-1, 4, 3)$.