MAT273 **Vectors**
12.2

1. Determine the vector from point $(1, -3, 4)$ to $(6, 4, 1)$ and determine its magnitude.

2. Consider the vectors $\vec{a} = \langle 2, -3, 5 \rangle$ and $\vec{b} = \langle 1, 1, -2 \rangle$.
   a) Determine $2\vec{a}$.

   b) Determine $\vec{a} + \vec{b}$.

   c) Determine $\hat{a}$, the unit vector parallel to $\vec{a}$.

Answers:

1. Subtracting the position vectors results in $\langle 6-1, 4-(-3), 1-4\rangle = \langle 5, 7, -3\rangle$, and the magnitude of this vector is $|\langle 5, 7, -3\rangle| = \sqrt{5^2 + 7^2 + (-3)^2} = \sqrt{83}$.
2.
   a) $2\vec{a} = 2 * \langle 2, -3, 5\rangle = \langle 4, -6, 10\rangle$
   b) $\vec{a} + \vec{b} = \langle 2, -3, 5\rangle + \langle 1, 1, -2\rangle = \langle 3, -2, 3\rangle$
   c) $\hat{a} = \frac{\vec{a}}{|\vec{a}|} = \frac{\langle 2,-3,5\rangle}{\sqrt{4+9+25}} = \frac{\langle 2,-3,5\rangle}{\sqrt{38}} = \frac{1}{\sqrt{38}}\langle 2, -3, 5\rangle$