EE331 — Homework #6 / Due Wednesday, Feb. 26, 2020 **at the beginning of class**

1. Given vectors $\mathbf{A} = 4\hat{\mathbf{a}}_x - 2\hat{\mathbf{a}}_y + 6\hat{\mathbf{a}}_z$ and $\mathbf{B} = 12\hat{\mathbf{a}}_x + 18\hat{\mathbf{a}}_y - 8\hat{\mathbf{a}}_z$, find (a) the dot product $\mathbf{A} \cdot \mathbf{B}$, (b) the cross product $\mathbf{A} \times \mathbf{B}$, and (c) the unit vector for $\mathbf{A}$.

2. Given vectors $\mathbf{A} = 4\hat{\mathbf{a}}_x - 2\hat{\mathbf{a}}_y + 6\hat{\mathbf{a}}_z$ and $\mathbf{B} = 12\hat{\mathbf{a}}_x + 18\hat{\mathbf{a}}_y - 8\hat{\mathbf{a}}_z$, find (a) the smaller angle between the two vectors, (b) the scalar projection of $\mathbf{A}$ along $\mathbf{B}$, and (c) the vector projection of $\mathbf{B}$ along $\mathbf{A}$.

3. Points 1 and 2 are given by $P_1(3, -2, 1)$ and $P_2(4, 6, 2)$, respectively. Determine (a) their position vectors $\mathbf{r}_1$ and $\mathbf{r}_2$, (b) the distance vector from point 1 to point 2, and (c) the distance between point 1 and point 2.