Kaleb Burris
University of Alaska Fairbanks
MATH F253, Elizabeth S. Allman, Homework 2

**2.4: 184, 188, 190, 195, 204, 205, 207, 210, 212, 214, 219, 228, 235**

184.

$$\vec{u} \times \vec{v} = \begin{vmatrix} \hat{\mathbf{i}} & \hat{\mathbf{j}} & \hat{\mathbf{k}} \\ 3 & 2 & -1 \\ 1 & 1 & 0 \end{vmatrix} = \hat{\mathbf{i}}(0 - (-1)) - \hat{\mathbf{j}}(0 - (-1)) + \hat{\mathbf{k}}(3 - 2) = \hat{\mathbf{i}} + \hat{\mathbf{j}} - \hat{\mathbf{k}} = \boxed{\langle 1, -1, 1 \rangle}$$

188.

$$\hat{\mathbf{j}}(\hat{\mathbf{k}} \times \hat{\mathbf{j}} + 2\hat{\mathbf{j}} \times \hat{\mathbf{i}} - 3\hat{\mathbf{j}} \times \hat{\mathbf{j}} + 5\hat{\mathbf{i}} \times \hat{\mathbf{k}}) = \hat{\mathbf{j}}(-\hat{\mathbf{i}} - 2\hat{\mathbf{k}} - 5\hat{\mathbf{j}}) = \hat{\mathbf{k}} - 2\hat{\mathbf{i}} = \boxed{-2, 0, 1}$$

190.

$$\vec{u} \times \vec{v} = \begin{vmatrix} \hat{\mathbf{i}} & \hat{\mathbf{j}} & \hat{\mathbf{k}} \\ 2 & 6 & 1 \\ 3 & 0 & 1 \end{vmatrix} = \hat{\mathbf{i}}(6) - \hat{\mathbf{j}}(2 - 3) + \hat{\mathbf{k}}(0 - 18) = 5\hat{\mathbf{i}} + \hat{\mathbf{j}} - 18\hat{\mathbf{k}}$$

$$\frac{6\hat{\mathbf{i}} + \hat{\mathbf{j}} - 18\hat{\mathbf{k}}}{\sqrt{36 + 1 + 324}} = \boxed{\frac{6\hat{\mathbf{i}}}{19} + \frac{\hat{\mathbf{j}}}{19} - \frac{18\hat{\mathbf{k}}}{19}}$$

195.

$$\text{Given: } \vec{u} \neq \vec{0} \quad \vec{v} \neq \vec{0}$$
$$2$$