

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

184.

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

188.

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

190.

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

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

195.

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

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