Problem 4 - 3.2.1:

We know that

\[ P = P_x \hat{x} + P_y \hat{y}, \]

and

\[ Q = Q_x \hat{x} + Q_y \hat{y}, \]

Let’s calculate their vector product

\[ P \times Q = (P_x Q_y - Q_x P_y) \hat{z}, \]

which shows that the vector is in the z-direction.