1. Find a vector that is in the same direction as \( \langle 2, -3, 5 \rangle \), and has specified length.

(a) \(|a| = 1\)

**Solution:** Denote the given vector by \( \mathbf{b} \). The desired (unit) vector \( \mathbf{a} \) is given by

\[
\mathbf{a} = \frac{\mathbf{b}}{|\mathbf{b}|}
\]

Now \(|\mathbf{b}|\) is given by

\[
|\mathbf{b}| = \sqrt{2^2 + (-3)^2 + 5^2} = \sqrt{38}
\]

Thus \( \mathbf{a} = \langle 2/\sqrt{38}, -3/\sqrt{38}, 5/\sqrt{38} \rangle \)

(b) \(|a| = 2\).

**Solution:** This is given by (scalar-)multiplying the unit vector obtained from (a) by 2:

\[
\mathbf{a} = 2\langle 2/\sqrt{38}, -3/\sqrt{38}, 5/\sqrt{38} \rangle = \langle 4/\sqrt{38}, -6/\sqrt{38}, 10/\sqrt{38} \rangle