# Same Direction Different Length (Solution)

**26.** Find a vector that has the same direction as $\langle -2, 4, 2 \rangle$ but has length 6.

**Q12.2-26 from Calculus: Early Transcendentals 7e by Stewart**
**Why**: Need a vector in the same direction but a different length.
**Steps**:
1. Calculate the unit vector (same direction, magnitude 1).
2. Multiply by a scalar multiple of 6.

Let's check what the length of the vector is:

$$|\vec{v}| = \sqrt{(-2)^2 + (4)^2 + (2)^2} = \sqrt{4 + 16 + 4} = \sqrt{24} = 2\sqrt{6} \approx 4.9$$

(1) Find the unit vector $\hat{v}$:

$$\hat{v} = \frac{\vec{v}}{|\vec{v}|} = \frac{1}{2\sqrt{6}} < -2,4,2 >$$

(2) New vector has the same direction but magnitude of 6

$$\vec{u} = 6\hat{v} = \frac{6}{2\sqrt{6}} < -2,4,2 > = < -\sqrt{6}, 2\sqrt{6}, \sqrt{6} >$$

$\vec{u} = < -\sqrt{6}, 2\sqrt{6}, \sqrt{6} >$