

### Exercise 33

Motor neurons in mammals transmit signals from the brain to skeletal muscles at approximately 25 m/s. Estimate how long in ms it takes a signal to get from your brain to your hand.

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#### Solution

The distance from my head to my hand is about 3 feet. Use this fact along with the given speed to calculate the time it takes a signal to go from head to hand.

$$3 \cancel{\text{ft}} \times \frac{12 \cancel{\text{in}}}{1 \cancel{\text{ft}}} \times \frac{2.54 \cancel{\text{cm}}}{1 \cancel{\text{in}}} \times \frac{1 \cancel{\text{m}}}{100 \cancel{\text{cm}}} \times \frac{1 \cancel{\text{s}}}{25 \cancel{\text{m}}} \times \frac{1000 \text{ ms}}{1 \cancel{\text{s}}} = \frac{3 \times 12 \times 2.54 \times 1000}{100 \times 25} \text{ ms} \approx 40 \text{ ms}$$