

~ Average Speed ~

PHYSICS 203,
JOHN JAY COLLEGE OF CRIMINAL JUSTICE, THE CUNY
PROFS. MARTENS YAVERBAUM & BEAN

From here on in, the AVERAGE SPEED of an object is defined by the following fraction:

$$\text{AVERAGE SPEED} \equiv \frac{\text{TOTAL DISTANCE COVERED}}{\text{TOTAL TIME ELAPSED.}}$$

Always and only use the above definition to answer the questions below. (That underlining is supposed to mean "divided by".) Always include units.

I. Warm-ups.

These are not meant to be tricks. Make sure, however, to respond to each question with the units used in the question itself.

- A new car travels a total of 60 miles. The trip takes 2 hours. What is the car's average speed for the trip?
- An old car travels a total of 40 yards. The trip takes 4 days and includes three break-downs. What is the car's average speed for the trip?
- On average, a beam of light travels 186,000 miles every second. How far does light travel in 1000 seconds?

II. Fill Figure.

There is a hill in East Smurf Village. On this hill is a trail. Nobody knows how long the trail is. One fine morning, Papa Smurf drives his vehicle up the hill road at an average speed of 40 miles per hour. Arriving at the top, he takes a *negligible* amount of time to turn around. (This means that the time taken for turn-around is so small compared to the time taken for the trip itself that it can be *neglected* without any noticeable loss of accuracy.) Papa Smurf then drives his vehicle down the exact same trail. On the way down, he drives at an average speed of 60 miles per hour.

For the entire *round-trip* journey, what is Papa Smurf's **average speed**? (Be careful...)

III. Grandma Grimm.

It is 80 kilometers from the Hood cottage to Grandma's house. It will therefore be 80 kilometers back. Little Red Riding Hood sets off over the river and through the woods. She skips at an average speed of 40 kilometers per day. She takes a negligible amount of time to turn around once she finds a wolf standing in for her loved one.

At what average speed must Miss Hood travel back to the Hood cottage so that for the entire round-trip journey, her average speed is **80 KILOMETERS per DAY**? (Be careful...)