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Dear Complete Idiots,

You may want to contact booksellers; your book *A Complete Idiot's Guide To Physics* is being sold in the physics section of bookstores as if it were a real physics book and not merely a parody of a physics book. Perhaps bookstores can sell it in the humor section next to the *Onion*.

Perhaps I'm being too harsh; for the title does say -- the complete idiot's guide -- I just had no idea you were being literal. But you'll get no argument from me: you guys are complete idiots. On page 15 (see below) there is a glaring error that is in effect a cruel trick played on the struggling physics students that make up your readership. How many poor students have turned to you book for help in understanding difficult concepts only to be confused and discouraged because of your half-ass proofreading?

In disgust and hoping for a refund of my $18.95.

Mike Lynch

represents the velocity at any time then $v_f - v_0 = \Delta v$, the change in velocity. The *average velocity* is the change in position divided by the change in time: in symbols, $\bar{v} = \frac{\Delta x}{\Delta t}$, which is $\bar{v} = \frac{x_f - x_0}{t_f - t_0}$.

Imagine that a straight line can represent the couch. Distances x can be marked off along the line from one end of the couch to the other. Suppose we measure all distances relative to the first place the couch potato was sitting so that $x_0 = 0$ and $x_f = x$. Furthermore, suppose that we started the stopwatch when he first moved from the initial position and stopped it when he reached his final position so that $t_0 = 0$ and $t_f = t$. That means that $\bar{v} = \frac{x_f - x_0}{t_f - t_0} = \frac{x - 0}{t - 0} = \frac{x}{t}$.

In other words, the *average velocity* is equal to the length of the couch, x, divided by the time, t, required for him to travel that length. Therefore, from $\bar{v} = \frac{x}{t}$ the expression $x = \bar{v}t$ represents the position at any time t assuming that the couch potato is always traveling with the same motion. In words, the position or distance traveled at the end of a time interval is calculated by multiplying the average speed during that time interval by the time of the interval.

Plain English

The average velocity is the change in position of an object divided by the change in time.

Using Algebra to Calculate Velocity

Algebra enables us to communicate several ideas clearly and quickly with a few simple mathematical statements. Consider the following example.

Suppose you drive your car to school from home. Your route takes you along neighborhood streets to the interstate. You drive down the interstate for a few minutes. You then travel along neighborhood streets to the school parking lot where you park. The school is 15 miles from home and you make the trip in 3.0 minutes by driving within the speed limit of course. What is the average speed of your car for the short journey?

Solve any physics problem by first analyzing it into its parts and specifying properties of each part. In this case, we are given: (1) the distance in miles with two significant figures and (2) the time in minutes with two significant figures. Rarely do you see speed expressed in terms of minutes; it can be, but we use hours because that is a common unit used in the United States to indicate speed. From a defining equation, express the time as 5.0×10^{-1} hr or ½ hour to two significant figures. Secondly, we synthesize the parts with our definition of average velocity and solve the problem. That is, $\bar{v} = \frac{x}{t} = \frac{15mi}{5.0 \times 10^{-1} hr} = 3.0 \times 10^{1} \frac{mi}{hr}$.

$$\bar{v} = \frac{x}{t}$$
$$= \frac{15mi}{3.0 minutes \left(\frac{1hr}{60 minutes}\right)}$$
$$= \frac{15mi}{.05hr}$$
$$= 300 mph$$

of course this isn't within the speed limit