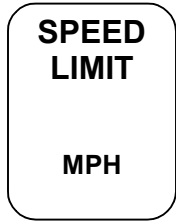


Just how fast is light, anyway?

Sure, light is pretty darn fast. But how fast is it relative to the things in our everyday experience? Let's do a few basic calculations.

1. As it's usually expressed, $c = 3 \times 10^8$ m/s (a number that's useful to remember). About how fast is this in miles per hour? (Write your final answer in the box at right. Use that 1 mile \approx 1.5 km.)



2. How many times faster is this than the speed of your car on a California interstate? (70 mph)

$$\frac{c}{v_{car}} =$$

3. It takes about 5 hours to get from Berkeley to L.A. at highway speeds. How long does it take light to get there? Calculate this in hours and then convert it to seconds. (Use ratios, and the fact that $d = v \times t$)

4. The circumference of the Earth is 40,000 km. Going back to our original expression for c and the expression $d = v \times t$, calculate about how long (in s) it would take light to circle the Earth.

5. Remember that light is composed of waves. The *wavelength* of light, designated by λ (lambda), is equal to the distance between two successive crests of the wave. The whole wave train speeds along at c .



How long does it take light to travel a distance of one wavelength, λ ? (Express algebraically)

6. How many wavelengths will pass through a given, stationary point in an amount of time t ?