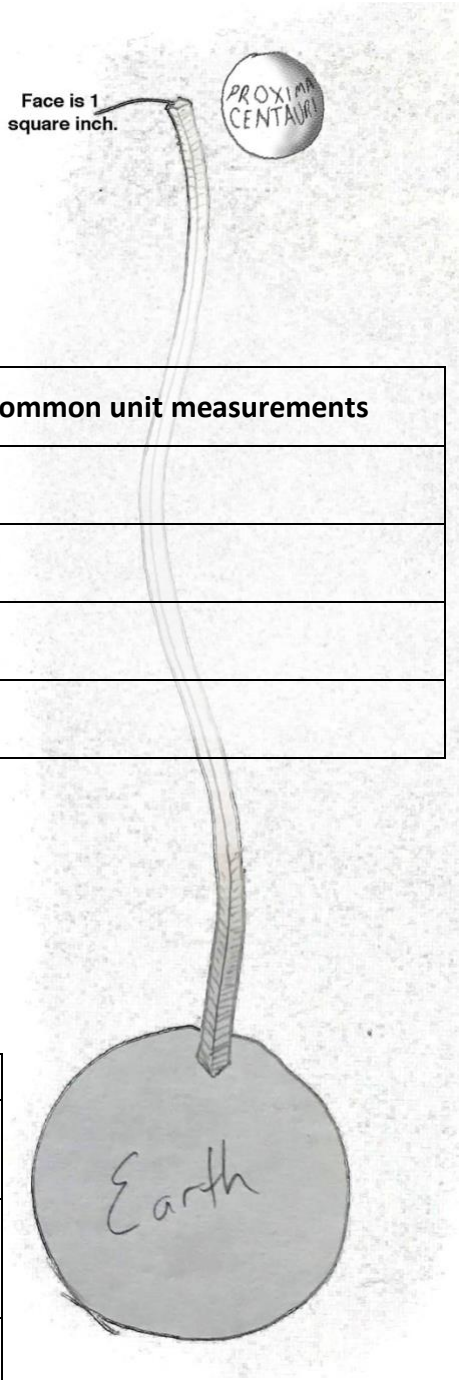
HomeWork Project/Quiz



Part I: One sheet of paper, the stuff you would be holding now if we were back on campus, is 0.1mm thick. I measured it with a micrometer and I also measured 500 sheets and divided by 500. This paper is 0.1mm thick. **How many times would you have to fold it in half for the resultant stack to reach Proxima Centauri**, the closest star to the sun? The big assumption here is that you have a piece of paper large enough to fold in such a way and that you could fold it at all. But disregard these details and focus on the math.

Knowns:	Use these measurements	Common unit measurements
Thickness of paper:	0.1mm	
Distance to Proxima Centauri:	4.243 light years	
Speed of light, c:	2.99792×10^8 m/sec	
Length of a year:	365.2425 days	

Part II:

Let's say that the face of the final super-tall stack of folded paper measures 1 square inch. If you unfolded the stack, **how big would the unfolded sheet of paper be?** Give your answer in square kilometers and also find a comparable area (a city, state, country, or planet) to which to compare this area in order to give it some context.

	Your answers
I. How many folds to Proxima Centauri?	
IIa. If $1in^2$ final face, how large is the unfolded sheet of paper?	
IIb. Comparable area.	

Part III:

Write up an equation that will determine the number of folds necessary to reach Proxima Centauri. The equation will be an exponential: f(x) = Distance to Proxima Centauri, where x is the number of folds. Then solve for x. This will involve logarithms.

Equation:
Solve for x:

A LIST OF THE PRIMARY LOG PROPERTIES.

1) $x = b^y$ is the same as $y = \log_b x,$

2a) $\log_b(xy) = \log_b x + \log_b y$

2b) $\log_b \frac{x}{y} = \log_b x - \log_b y$

3) $\log_B A = \frac{\log_c A}{\log_c B}$

4) $c \log_b x^a = \log_b x^{ac}$

And the annoying ones created by substitution.

$\log_b b^y = y$ and $b^{\log_b x} = x$