

Math Forum - Problem of the Week

Paper and the Moon [Problem #664]

A sheet of paper is .016 cm thick. Suppose that you tear this paper in half. Then you stack the two halves together and tear them in half. Then you take the four pieces, stack them, and rip them in half. If it were possible, you would continue this process of stacking the ripped pieces together and tearing them apart 60 times.

$$.016 = 1.6 \times 10^{-2}$$

You need to answer the following four questions correctly to receive credit. All answers must be written in scientific notation.

1. How many pieces would the stack have?

$$2^{60} = 1.5292 \times 10^{18}$$

2. How high would the stack reach?

$$(1.5292 \times 10^{18})(.016) = 1.8467 \times 10^{16} \text{ cm.}$$

$$30 \text{ cm} = 1 \text{ ft}$$

$$5,280 \text{ ft} = 1 \text{ mi.}$$

3. Would it be taller than the highest building (not under construction)? How high is the tallest building?

$$2717 \text{ Feet}$$

$$8.15 \times 10^8 \text{ cm} = 6.1489 \times 10^9 \text{ ft}$$

4. Would it be higher than the moon at its greatest distance from Earth? What is this distance?

$$240000 \text{ miles} \quad 2.4 \times 10^5 \text{ miles} \quad 1.1 \times 10^8 \text{ miles}$$

Be sure to show all your work and explain how you got your answers.

Need help in converting in the metric system? Try visiting the Learning Network's [Weights & Measures](http://www.infoplease.com/ipa/A0001657.html) [http://www.infoplease.com/ipa/A0001657.html].

Need to find information about the tallest building? Visit the [World's Tallest Buildings](http://www.infoplease.com/ipa/A0001338.html) [http://www.infoplease.com/ipa/A0001338.html].

Need to know the distance from the moon to the Earth? Check out [The Moon](http://www.infoplease.com/ipa/A0004434.html) [http://www.infoplease.com/ipa/A0004434.html].