

Names: \_\_\_\_\_

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Math 1110

Scientific Notation

Fall 2012

1. Assume you have a piece of paper which has a thickness of  $1 \times 10^{-7}$  km. If you were to fold it in half, how thick would the folded paper be?
2. If you were to fold the paper in half again (so that it has been folded twice), how thick would it be?
3. If you were to fold the paper in half a third time, it would be the same thickness as a stack of \_\_\_\_\_ pieces of paper, and the thickness of this stack would be \_\_\_\_\_ km.
4. Now, using scientific notation, fill in the chart (it is continued on the back of this page):

Number of Folds	Equivalent to ? Pieces of Paper	Thickness (km)
0	1	$1 \times 10^{-7}$
1	2	$2 \times 10^{-7}$
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____

7	_____	_____
8	_____	_____
9	_____	_____
10	_____	_____
11	_____	_____
12	_____	_____

To help you visualize this, after only 12 folds, the thickness of your paper will be a little less than 1 and a half feet, which is thousands of times thicker than the piece of paper that you started out with. Using this information, I want your group to guess (without calculating) how thick your paper would be if you were able to fold it the following number of times. Choose your answers from the list below and write the corresponding letter in the blank.

1. If folded 14 times the paper would be about \_\_\_\_\_ km thick.
2. If folded 30 times the paper would be about \_\_\_\_\_ km thick.
3. If folded 50 times the paper would be about \_\_\_\_\_ km thick.
4. If folded 100 times the paper would be about \_\_\_\_\_ km thick.

#### Answer Choices

- (a)  $1.6 \times 10^{-3}$  km, the height of an average human
- (b)  $7 \times 10^{-3}$  km, the length of the average male killer whale
- (c) 8.848 km, the height of Mount Everest
- (d) 10 km, the length of the Bolder Boulder
- (e)  $1.074 \times 10^2$  km, the distance from the ground to the outer limits of the atmosphere
- (f)  $1.125 \times 10^8$  km, the distance to the sun.
- (g)  $4.731 \times 10^9$  km, the distance from Mercury to Pluto
- (h)  $1.268 \times 10^{23}$  km, the estimated radius of the known universe
- (i)  $9.872 \times 10^{23}$  km

Answers:

If folded 14 times the paper would be about  $1.6 \times 10^{-3}$  km thick. About the height of the average person.

If folded 30 times the paper would be about  $1.074 \times 10^2$  km thick. The distance from the ground to the outer limits of the atmosphere.

If folded 50 times the paper would be about  $1.125 \times 10^8$  km thick. The distance to the sun.

If folded 100 times the paper would be about  $1.268 \times 10^{23}$  km thick. The estimated radius of the known universe.