

Name: _____

Date: _____

**EXPONENTIAL GROWTH AND DECAY
HOMEWORK**

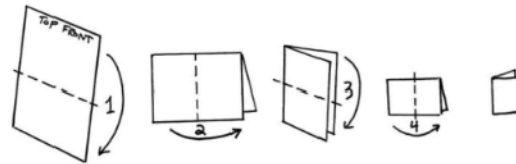
APPLICATIONS

1. A piece of paper is 0.01 centimeters (cm) thick. When you fold it once, it becomes 0.02 centimeters thick. If you fold it again, it doubles again to 0.04 centimeters thick. Each fold doubles the thickness of the paper.

(a) How thick is the paper after:

4 Folds: $.04 \times 2 = .08 \text{ cm}$

5 Folds: $.08 \times 2 = .16 \text{ cm}$



(b) For each of the following number of folds, f , show how you can calculate the thickness, T , based on repeatedly multiplying by 2.

$f = 0 \quad T = 0.01$

$f = 1 \quad T = 0.01(2)^1 = 0.02$

$f = 2 \quad T = 0.02(2) = 0.01(2)(2) = 0.01(2)^2$

$f = 3 \quad T =$

$f = 4 \quad T =$

(c) Determine a formula, based on (b), for the thickness, T , based on the number of folds, f .

$a(b)^x$ $.01(2)^f$

(d) How thick would the paper be if $f = 10$? Use proper units

$.01(2)^{10} = 10.24 \text{ cm}$

(e) If there are 100 centimeters in a meter, how many *meters* thick is the paper after 20 folds? Show the work that leads to your answer.

$.01(2)^{20} = \frac{10,485.76 \text{ cm}}{100} = 104.8576 \text{ m}$

(d) If there are 1000 meters in a kilometer and the Moon is 384,000 kilometers away from the Earth, will the paper reach the Moon after 40 folds? Show the calculations that lead to your answer.

$.01(2)^{40}$

