**Exponential Growth:**

 **The first parable was about the chess board.** The chess board has 8 rows and 8 columns for a total of 64 squares. Two equations are needed for problems on the chess board:

1. No. of grains on any particular square = $2^{(N-1)}$ where N = square No. = 1,2,3,…64
2. Total No. of grains up to and including square N = $2^{N}$-1

For example if you were asked:

1. How many grains are there on square 10?

Answer: Square 10 has grains = $2^{(10-1)}$= 512 grains

1. What is the total no. of grains up to and including square 10?

Answer: Total no. of grains up to and including square 10 = $2^{10}$-1 = 1023 grains

1. What is the weight of the total no. of grains up to and including square 10, knowing that one grain weighs 1/7000 of a pound.

Answer: Total weight of grains up to and including square 10 = 1023 \*1/7000 = 0.15 Lbs.

**The second parable was about the leprechaun with the magic penny.**

The Amount of money (in dollars) on any particular day = $\frac{2^{t}}{100}$ where t = day no., t = 0,1,2,3,4,…

So on day 0 (the starting day when you met the leprechaun) you have one penny, then on day 1 you have two pennies, and then 4 pennies and son on.

How much money would you have on day 30?

Answer = $\frac{2^{30}}{100}$ = 10,737,418.24 (ten million, seven hundred thirty seven thousand, four hundred eighteen dollars and 24 cents)!!

The third parable was about the bacteria in a bottle. The total no. of bacteria at any time t is:

 No. of bacteria = $2^{t}$ where t is the reference time in minutes.

 T = time -11:00AM

So for example: How many bacteria would be in the bottle at 11:38AM?

Answer: at 11:38 AM, t = 11:38AM-11:00AM =38 minutes.

This implies that No. of bacteria at 11:38AM = $2^{38}$= 2.75E11 = 2.75 \*$10^{11}$.

The letter E that you get from your TI means 10 to the power. It is an exponential notation.