Problem Solving Seminar – Some Problems on Exponential Functions

1. A biologist notices that a certain bacterium splits into 2 separate bacteria once every 15 minutes. If there was one bacterium on the side 3 hours ago, how many are there on the slide now?

2. Suppose a bacterium divides in half every half hour, then the two resulting bacteria divide in the next half an hour. At this rate, how many bacteria would there be in 72 hours?

3. As a biology project, Nicole is investigating how fast a particular beetle population will grow under controlled conditions. She started her experiment with 5 beetles. The next month she counted 10 beetles.

If the beetle population is growing linearly, how many beetles can Nicole expect to find after 2, 3, and 4 months?

If the beetle population is growing exponentially, how many beetles can Nicole expect to find after 2, 3, and 4 months?

4. A lady has a certain number of dollar bills in her purse. She has no other money. She spends half the money on a hat and gives $1 to a beggar outside the store. She spends half the remaining dollars for lunch and tips the waiter $2. She then spends half the remaining dollars for a book, and just before she goes home she spends $3 on a hot fudge sundae. She now has $1 left. How many dollars did she begin with?

5. You have a pair of jeans. Every time they are washed, they lose 5 percent of their color. After 12 washings, what is the percent of their original color?

6. The Amazon River in Brazil contributes more water to the Earth’s oceans than any other river. Each second, is discharges 4.2 x 106 cubic feet of water into the Atlantic Ocean. How much water does the Amazon River discharge into the Atlantic Ocean each year?

7. I am thinking of a power of 2. When I write it in standard form, it has 16 digits. If I multiply it by 2, the answer has 17 digits. What power of 2 am I?