

# TJVMT POTW

Set #3

11/21/07 - 11/28/07

The problems this week will be of a slightly different flavor.

1S. Each of the following sequences follows a pattern. Find the next term in the sequence. Each part is worth one point.

- a) 1,1,1,3,5,9,17,31,57,105,193,355
- b) 1,2,4,5,8,10,16,20,25,32,40,50,64,80,100,125
- c) -1,1,7,20,43,79,131,202,292,413,559,736
- d) 74,65,61,37,58,89,145,42,20,4
- e) 1,4,27,56,25,56,43,16,89,0,11,56
- f) 2,3,7,17,47,140,442,1443,4896,16851,58775,208156
- g) 100,495,161,392,752,119,160,186,190,173,141,105,711,  
441,253,134,665,306,132,535,204,733,248,797,242

2S. Make 24 with the number 3,3,9,9, using addition, subtraction, multiplication, division, exponentiation, logarithms, combinations, and/or factorials. You will receive one point for each essentially different method, up to a maximum of seven points.

3S. You are given the decimal approximation of the answer to each part to within a trillionth. Find the nicest expression for the exact value of the answer. Note that for all parts except a and g, I can express the answer in three symbols or less, where a digit is a symbol, and functions and operators like addition, exponentiation, sin, log, count as one symbol. Each part is worth one point.

- a) 0.538461538462
- b) 0.698970004336
- c) 0.523598775598
- d) 2.618033988750
- e) 23.140692632779
- f) 2.506628274631
- g) 3.522333393359