Name: _____ **Id:** _____

10 pts 1. According to the poem by Ogden Nash,

Big fleas have little fleas,
Upon their backs to bite 'em,
And little fleas have lesser fleas,
And so, ad infinitum.

Assume each flea has exactly two fleas which bite it. If the largest flea weighs 0.8 grams, and each flea is 1/8 the weight of the flea it bites, what is the total weight of all the fleas?

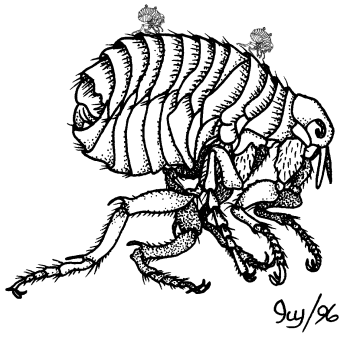

image adapted from
http://biodidac.bio.uottawa.ca

10 pts 2. The series $\sum_{n=1}^{\infty} \frac{1}{n^2}$ converges to $\frac{\pi^2}{6}$. How many terms are necessary so that $\sum_{n=1}^{K} \frac{1}{n^2}$ is within 1/1000 of $\pi^2/6$?

YOU DON'T HAVE TO DO THIS
(BUT YOU CAN IF YOU WANT TO.)

Name: _____ **Id:** _____

10 pts 5. Determine the interval of convergence of the power series $\sum_{n=1}^{\infty} \frac{(2x-7)^n}{n}$

Name: _____ **Id:** _____

15 pts 6. For each of the series below, determine whether it converges or diverges. You must fully justify your answer to get any credit (that is, indicate what test you used, etc.).

(a) $\displaystyle\sum_{n=2}^{\infty} \frac{2}{n \ln n}$

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{n^3+5}{(n^3+2)(n^3+3)}$

(c) $\displaystyle\sum_{n=1}^{\infty} \frac{\cos(n)}{n^3}$