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CS 182

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**Homework 3**

**Part 1**

I chose the approximation formula which is a variation of the equation:

This was then modified using the inverse of the above equation and was fit to work with the zeta function, as shown below:

I chose this approximation function because it was very similar to one that was given in the textbook. With a few modifications, this approximation function was very close to the exact calculation. I was able to find the exact calculation of this function using the following MATLAB code:

x = 0, s = 2

for n=1:1000, x=x+(1/(n^s)), end

I was able to find the approximate calculation of this function using the following MATLAB code:

x = ((6 \* (1000^3))/(1000\*(1000 + 1)\*(2\*1000 + 1))) - 0.3

See attached data chart and plots.

**Part 2**

I chose the approximation formula which is derived below:

I chose this approximation function because it was easiest to derive using basic calculus and integration. I was able to find the exact calculation of this function using the following MATLAB code:

x = 0

for n=1:1000, x=x+log(n), end

I was able to find the approximate calculation of this function using the following MATLAB code:

x = 1000\*log(1000) - 1000 + 1

See attached data chart and plots.