Test 3 - Calculus II (Spring 2015)

INSTRUCTIONS: Complete each of the following problems in your Bluebook. Each problem is worth a maximum of 12 points. Points will be awarded for both completeness and clarity of solutions. Partial credit will be awarded for partial solutions. Please recall that **cell phones and graphing calculators are not allowed on this exam.**

1. Determine the convergence or divergence of the following series. Clearly justify your answer.

(a) $\displaystyle\sum_{k=1}^{\infty}\left(\frac{2k^2}{5k^2+k}\right)^k$ (b) $\displaystyle\sum_{k=1}^{\infty}(-1)^k\cdot\frac{k}{2k+15}$

2. Determine whether the series $\displaystyle\sum_{n=0}^{\infty}(-1)^n\left(\frac{n}{n^{3/2}+10}\right)$ converges absolutely, converges conditionally, or diverges. Clearly justify your answer.

3. Find the fourth degree term of the Maclaurin series expansion for $(x+1)^{5/2}$.

4. Determine the interval of convergence of the power series $\displaystyle\sum_{n=1}^{\infty}\frac{(x-3)^n}{2^n\sqrt{n}}$.

5. Find the Maclaurin series expansion for xe^{5x}, and determine its interval of convergence.

BONUS. (+12 points) Compute the values of the following convergent infinite series. Credit will only be awarded for clearly justified answers.

(a) $\displaystyle\sum_{k=1}^{\infty}\frac{(-1)^{k+1}}{k}=1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\frac{1}{5}-\frac{1}{6}+...$

(b) $\displaystyle\sum_{k=0}^{\infty}\frac{4\cdot(-1)^k}{2k+1}=4-\frac{4}{3}+\frac{4}{5}-\frac{4}{7}+\frac{4}{9}-\frac{4}{11}+...$

(c) $\displaystyle\sum_{k=0}^{\infty}\frac{1}{k!}=1+\frac{1}{1!}+\frac{1}{2!}+\frac{1}{3!}+\frac{1}{4!}+\frac{1}{5!}+\frac{1}{6!}+...$

(d) $\displaystyle\sum_{k=0}^{\infty}\frac{(-1)^k}{k!}=1-\frac{1}{1!}+\frac{1}{2!}-\frac{1}{3!}+\frac{1}{4!}-\frac{1}{5!}+\frac{1}{6!}+...$