BC 3 Name:_____

Taylor Review

(1) Write out Maclaurin series for the following. Show four terms and simplify a little.

$\cos\left(x^3\right) =$

$x^2 e^{3x} =$

$\dfrac{3x}{1-2x} =$

$\dfrac{\sin(2x)}{x} =$

(2) Write the 3rd degree Taylor polynomial for $f(x) = \sin(x)$ with $a = 3\pi/4$. Then state the Lagrange error term.

(3) If $\sin(3x)$ is to be approximated by two non-zero terms with $|x| < .4$, find an upper bound for the error.

(4) How many terms must be used to approximate e^2 with an error less than .05?

(5) What values of x may be used if $\cos(2x)$ is to be approximated by two non-zero terms with an error less than .005?

(6) Find the value of each series by recognizing the function and the point at which it is evaluated.

$$1 - \frac{(.2)^2}{2!} + \frac{(.2)^4}{4!} - \ldots =$$

$$1 + \frac{1}{2} + \frac{(1/2)^2}{2!} + \frac{(1/2)^3}{3!} + \ldots =$$

$$1 - .4 + \frac{(.4)^2}{2} - \frac{(.4)^3}{6} + \ldots =$$

(7) Use series to approximate $\int_0^{1.3} \cos(x^2)\,dx$ with an error less than .005.

(8) If $f(x) = \sum_{n=0}^{\infty} (x/2)^n$, find the interval of convergence for f, for f', and for F.

(9) If the Taylor series for a function f converges on the interval $(-2, 10]$, find the interval of convergence:
for the series $f(2x)$

for the series $f(-x)$

(10) Let $f(3) = 5$, $f'(3) = -2$, $f''(3) = 4$, and $|f^{(n)}(x)| < \frac{n^2 - 1}{2}$ for all x and $n \geq 3$.
Find the Taylor series for f at $a = 3$, showing 3 terms.

If these three terms are used to approximate $f(2.8)$, find an upper bound for the error.