Test Chapter 9 (9.1-9.3 Practice Test) Name:________________________

1) Find a power series representation for $\frac{x^2}{1 - x^3}$. (Include a formula for the nth term and a formula for the summation). Then find the interval of convergence for the series.

2) Find the first three nonzero terms for the Taylor Polynomial generated by $f(x) = \cos 4x$ at $x = \frac{\pi}{4}$.

B) Show that $|f(x)-P_4(x)| < \frac{1}{2000000000}$ between $\frac{23\pi}{90} < x < \frac{\pi}{4}$ (This means you must use Taylors Inequality or use the Alternating Estimation Thm if the series is alternating)

C) Find $\left|f(\frac{23\pi}{90})-P_4(\frac{23\pi}{90})\right|$

3) a) Find the Taylor polynomial of order 4 for $f(x) = e^{4x}$ at $x = 0$.

B) Show that $|f(x) - P_4(x)| < \frac{7}{1000}$ between $0 < x < .2$ (This means you must use Taylors Inequality or use the Alternating Estimation Thm if the series is alternating)

C) Find $|f(.2) - P_4(.2)|$.

4) a) Find the Taylor polynomial of order 3 for $f(x) = \ln(1 + x^3)$ at $x = 0$.

b. Show that $|f(x) - P_3(x)| \leq \frac{1}{2000000}$ between $0 < x < .1$ (This means you must use Taylors Inequality or use the Alternating Estimation Thm if the series is alternating)

5) Let f be a function that has derivatives of all orders on the interval $(-\infty, \infty)$. Assume that $f(0) = 4$, $f'(0) = -2$, $f''(0) = 36$, and $f'''(0) = -24$.

(a) Find the third-order Taylor polynomial about $t = 0$ for $f(t)$,

(b) Find the second-order Taylor polynomial about $t = 0$ for $f'(t)$,

(c) Find the fourth-order Taylor polynomial about $t = 0$ for

$$\int_0^x f(t)\,dt$$

(d) Find the third-order Taylor polynomials for $h(x) = f(3x)$

6) Use a familiar MacClaruin series to help you integrate the following. Make sure you include a rule for the nth term and a rule for the sum.

$$\int \frac{\ln(1 - t)}{t^2} =$$

7) Use a familiar MacClaruin series to help you integrate the following. Make sure you include a rule for the nth term and a rule for the sum.

$$\int \tan^{-1}(x^2) =$$

8) Use a familiar MacClaruin series to help you integrate the following. Make sure you include a rule for the nth term and a rule for the sum.

$$\int \frac{x^2}{1-x^8} =$$