Assignment #16 ***Math 181*** ***Name:***

1. Find a power series for the function, centered at c, and determine the interval of convergence.

a) $f(x)=\dfrac{1}{3-x};\ c=5$

b) $f(x)=\dfrac{1}{2x-3};\ c=0$

c) $f(x)=\dfrac{4x-7}{2x^2+3x-2};\ c=0$

d) $f(x)=\dfrac{x+1}{2x^2+5x-3};\ c=2$

e) $f(x) = \ln(1 + 2x^4)$

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f) $f(x) = \arctan(5x^3)$

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g) $f(x) = \frac{x}{(1 + 3x^4)^2}$

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h) $f(x) = \frac{2}{3x^4 - 5}$

2. Find the Maclaurin series for the following functions:

a) $f(x) = e^{x^2/3}$

b) $f(x) = x^3 \sin(5x)$

c) $f(x) = \cos^2(3x)$

d) $f(x) = \dfrac{3x - 1}{2x + 5}$

3. Determine the Taylor's series of the following:

a) $f(x)=\sin(x)\ about\ a=\dfrac{2\pi}{3}$

b) $f(x)=\cos(x)\ about\ a=\dfrac{7\pi}{6}$

4. Evaluate the following:

a) $\displaystyle\sum_{n=0}^{\infty}\frac{(-1)^n\pi^{2n-1}}{(2n+1)!3^{2n+2}}$

b) $\displaystyle\sum_{n=0}^{\infty}\frac{(-1)^n 2^{2n-1}}{n!3^{2n+2}}$

c) $\displaystyle\sum_{n=0}^{\infty}\frac{(-1)^n\pi^{2n-1}}{(2n)!4^{n-1}}$

5. Use power series to approximate the following:

a) $\int \frac{\cos(3x^4)}{x}dx$

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b) $\int \frac{e^{-3x^5}}{x^2}dx$

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6. Use Binomial Theorem to find the first five terms of the following:

a) $f(x) = \frac{1}{\sqrt[3]{1-x}}$

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b) $f(x) = (1+x^2)^{4/5}$