

## Spring 2009 Math 152

*courtesy: Amy Austin*  
(covering section 10.5-10.6)

### Section 10.5

1. For the following power series, find the radius and interval of convergence.

a.)  $\sum_{n=1}^{\infty} \frac{(-4)^n x^n}{n^2 + 5}$

b.)  $\sum_{n=1}^{\infty} \frac{(-2)^n (3x - 1)^n}{\sqrt{n}}$

c.)  $\sum_{n=0}^{\infty} \frac{(2n)!(x + 2)^n}{100^n}$

d.)  $\sum_{n=0}^{\infty} \frac{(x - 1)^n}{(2n + 1)!}$

e.)  $\sum_{n=2}^{\infty} \frac{(-1)^n (x - 1)^n}{2^n \ln n}$

2. Suppose it is known that  $\sum_{n=0}^{\infty} c_n(x)^n$  converges when  $x = -4$  and diverges when  $x = 6$ . What can be said about the convergence or divergence of the following series:

a.)  $\sum_{n=0}^{\infty} c_n(8)^n$

b.)  $\sum_{n=0}^{\infty} c_n(-3)^n$

c.)  $\sum_{n=0}^{\infty} c_n$

d.)  $\sum_{n=0}^{\infty} c_n(4)^n$

### Section 10.6

3. Express the following functions as a power series. Identify the radius of convergence.

a.)  $f(x) = \frac{1}{1 - 8x}$

b.)  $f(x) = \frac{1}{2 + x^2}$

c.)  $f(x) = \frac{x^4}{5 - x}$

d.)  $f(x) = \ln(x + 15)$ , then  $g(x) = x^2 \ln(x + 15)$

e.)  $f(x) = \arctan(2x)$

f.)  $f(x) = \frac{1}{(1 - 2x)^2}$

4. Express  $\int_0^{1/2} \frac{1}{1 + x^5} dx$  as an infinite series.

5. Evaluate  $\int_0^{0.1} \frac{1}{1 + x^3} dx$  with error less than .01.