

EMT 121

Worksheet IX - Power series

May 17, 2010

1. Express $\frac{1}{x}$ as a Taylor series centered at 1.

2. Find the radius of convergence and interval of convergence of:

(a)
$$\sum_{n=0}^{\infty} \frac{n(x+2)^n}{3^{n+1}}$$

(b)
$$\sum_{n=0}^{\infty} n!x^n$$

(c)
$$\sum_{n=1}^{\infty} \frac{(x-3)^n}{n}$$

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

3. Express as a Maclaurin series and determine the interval of convergence.

(a) e^x

(b) e^{x^2}

(c) $\sin x$

(d) $\tan^{-1} x$

4. Approximate the function $f(x) = \sqrt[3]{x}$ by a Taylor polynomial of degree 2 at $c = 8$