

## Math 232 Worksheet 14 - Taylor Series

1. Expand the function as a power series centered at 0.

(a)  $\frac{x}{1-x}$

(b)  $\frac{1}{(1-x)^3}$

(c)  $\ln(2-x)$

(d)\*  $\frac{1}{x^2-2x-3}$

2. Find the Taylor series for the given function at  $a$ .

(a)  $e^x$ ,  $a = 1$

(b)  $\cos x$ ,  $a = 0$

(c)  $\sin x$ ,  $a = 0$

**Answer Keys:**

1. (a)  $\sum_{n=1}^{\infty} x^n, |x| < 1$       (b)  $\sum_{n=0}^{\infty} \frac{(n+2)(n+1)}{2} x^n, |x| < 1$       (c)  $\ln 2 - \sum_{n=1}^{\infty} \frac{x^n}{n2^n}, |x| < 2$
2. (a)  $\sum_{n=0}^{\infty} \frac{e}{n!} (x-1)^n$       (b)/(c) see text