

- Please see the course webpage for the answer key.

**1.** Find the Interval and Radius of Convergence for the following power series. Analyze carefully and with full justification.

$$\sum_{n=0}^{\infty} \frac{(-1)^n (7x - 3)^n}{(n + 1) 5^{n+1}}$$

**2.** Find the Interval and Radius of Convergence for the following power series. Analyze carefully and with full justification.

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

**3.** Find the MacLaurin Series representation for each of the following functions. State the Radius of Convergence for each series. Your answer should be in sigma notation  $\sum_{n=0}^{\infty}$ .

(a)  $f(x) = \frac{x^2}{1 + 5x}$

(b)  $f(x) = x^7 \sin(x^2)$

(c)  $f(x) = x \arctan(3x)$

(d)  $f(x) = x^4 e^{-x^3}$

(e)  $f(x) = x^3 \ln(1 + x^3)$

(f)  $f(x) = x^2 \cos(4x)$