

Name: \_\_\_\_\_

Id: \_\_\_\_\_

2. 12 points Find the Maclaurin series of each of the given functions. I suggest you use a familiar power series as your starting point.

(a)  $e^{3x^2}$

(b)  $\frac{1}{1+4x}$

(c)  $\sin 2x$

3. 12 points For each of the series below, decide if it converges or diverges. **You must justify your answer to receive full credit.**

(a) 
$$\sum_{n=1}^{\infty} \frac{2^n}{5^n + 3^n} = \frac{1}{4} + \frac{2}{17} + \frac{1}{19} + \frac{8}{353} + \dots$$

(b) 
$$\sum_{n=2}^{\infty} \frac{1}{n \ln n} = \frac{1}{2 \ln 2} + \frac{1}{3 \ln 3} + \frac{1}{4 \ln 4} + \dots$$

(c) 
$$\sum_{n=0}^{\infty} \frac{10^n}{n!} = 1 + 5 + \frac{500}{3} + \frac{1250}{3} + \dots$$

Name: \_\_\_\_\_

Id: \_\_\_\_\_

4. 16 points Let  $f(x) = x^{1/3}$ .

(a) Find the Taylor polynomial of degree 2 centered at  $a = 8$  for  $f(x)$ .

(b) If the result of the previous part is used to estimate  $9^{1/3}$ , what is the error (according to Taylor's theorem)?