

**MATH 2320 Test 3**

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

1. For the following Series state whether the series converges or diverges, the test you used, the criteria satisfied and show your work.

(a)  $\sum_{k=1}^{\infty} \frac{1}{2k+2}$

(b)  $\sum_{k=1}^{\infty} \left(1 - \frac{1}{k}\right)^k$

$$(c) \sum_{k=1}^{\infty} \left(1 - \frac{1}{k}\right)^{k^2}$$

$$(d) \sum_{k=1}^{\infty} \frac{k}{2^k}$$

(e)  $\sum_{k=1}^{\infty} \frac{(-1)^k}{k!}$

2. Compute  $\int x e^{x^2} dx$ .

3. Find the interval of convergence for the following power series.  $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}} x^n$

4. Find the Taylor series for the following function  $f(x) = e^{2x}$  centered at  $a = 1$  using the definition.

5. Find the Taylor series using known series for  $f(x) = x^2 e^{x^2}$  where  $a = 0$ .

6. Graph the following

(a)  $\frac{x^2}{4} - \frac{y^2}{9} = 1$

(b)  $x^2 - y = 1$