

## Math 2320 - Final Exam

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

1. Let  $a(t) = 4\cos(2t) + 8\sin(2t)$  be the acceleration for a particle. Assume we know that the initial position is 5 and the initial velocity is 3.
3. Compute the functions velocity,  $v(t)$ , and position  $s(t)$ .

2. Compute the area between the two functions  $f(x) = x^2 - 1$  and the line  $f(x) = 3$ .

3.  $\int x^3 e^{4x^4-1} dx$

4.  $\int x^2 e^{3x} dx$

5.  $\int \cos^2(4x) \, dx$

$$6. \int \frac{1}{x\sqrt{x^2+4}} dx$$

$$7. \int \frac{x+1}{x^2-2x-8} dx$$

8. For the following determine if the series converges or diverges. State the test you used, the criteria satisfied your conclusion and as always show your work.

(a)  $\sum_{n=1}^{\infty} \frac{e^n}{n!}.$

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



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

$$(d) \sum_{n=1}^{\infty} \frac{e^{n^2}}{n!}.$$

9. Compute the Interval of convergence for the following power series.

$$\sum_{n=1}^{\infty} \frac{3}{4n+1} x^n$$

10. Compute the Taylor Series for the function  $f(x) = \ln(3x)$  at the point  $a = 1$ .