

Math 116 Exam 2 Name _____ Section ____

1. A particle moves in a straight line starting at $(1, 2)$ when $t = 0$ and ending at $(3, 5)$ when $t = 1$.

a) Write parametric equations $x(t), y(t)$ for the path.

b) Find the speed $v(t)$.

2. a) Sketch the curve $r = \sin(\theta), 0 \leq \theta \leq \pi$.

b) Set up (do not evaluate) the integral for the area enclosed by this curve.

3. A ten inch rod has density $\rho(x) = e^{-x}, 0 \leq x \leq 10$. Find the mass of the rod.

4. Find the work done in pulling up a 10 foot chain which weighs 30lbs. You are standing at the top of a 10 foot platform and the chain extends from the platform to the ground.

5. Find the sum $\sum_{i=0}^{\infty} (1/3)^i - \sum_{i=0}^{\infty} (1/4)^i$.

6. To the right of each of the series below, write (converges/diverges) (choose one) by the (-----) (put in the name of a test).

a) $\sum_{n=0}^{\infty} (-1)^n 1/n$.

b) $\sum_{n=0}^{\infty} (n+1)/(n+2)$

c) $\sum_{n=0}^{\infty} (n^2+1)/(n^4+2)$

7. Investigate the convergence of $\sum_{n=2}^{\infty} 1/(\ln n)^5 (1/n)$.

8. Investigate the convergence of $\sum_{n=1}^{\infty} 2^n/n!$.

9. Find the radius and then the interval of convergence of the power series $\sum_{n=0}^{\infty} [(n+1)/(2n+1)](x-1)^n$.

10. a) Write the first three terms of the Taylor series for $f(x) = 1/x$, based at $x = 1$.

b) Write the complete Taylor series for $1/x$ based at $x = 1$. **Use \sum notation.**