East Los Angeles College
Department of Mathematics
Math 262
Final Exam Study Guide

Determine the limits for the following.

1. $\lim_{x\to\infty} xe^{-\sqrt{x}}$

2. $\lim_{x\to\infty} \left(\frac{x-1}{x+1}\right)^x$

3. Determine intervals of increasing/decreasing.

$$y=(x-2)e^{-x}$$

4. Determine the arc length for the curve $y = 2ln\left(sin\left(\frac{1}{2}x\right)\right)$ over $\frac{\pi}{3} \le x \le \pi$.

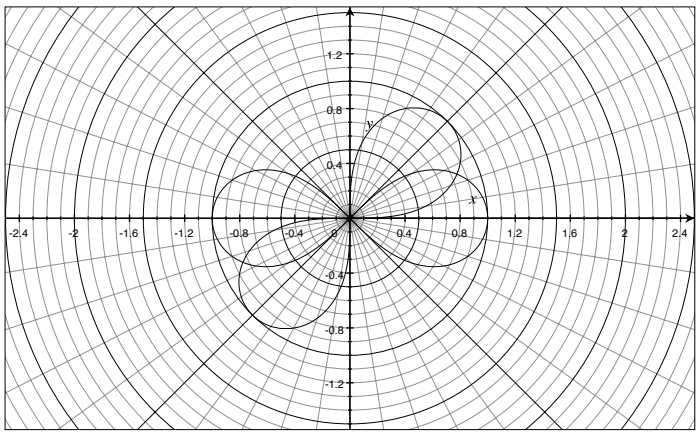
5. Determine the surface area of the solid by rotating the curve $y = x^2$ over $0 \le x \le 1$ about the y-axis.

6. Let C be the arc of a circle described by the parametric equations given. Determine the surface area by revolving C about the x-axis.

$$x = 3\cos(t)$$
$$y = 3\sin(t)$$
$$0 \le t \le {}^{\pi}/_{3}$$

Find the area of the region that lies inside both curves.

7. $r^2 = sin(2\theta)$ and $r^2 = cos(2\theta)$



Determine the exact length of the polar curve.

8. $r = e^{2\theta}$ for $0 \le \theta \le 2\pi$

Determine whether the series converges or diverges. Show Work for credit, no guessing.

9. $\sum_1^\infty ln\left(\frac{n^2+1}{2n^2+1}\right)$

10. $\sum_1^\infty \sqrt[n]{5}$

11. $\sum_1^\infty \frac{ln(n)}{n^3}$

Determine whether the following series converges or diverges. If it converges, what is the sum?

12. $\sum_1^\infty \left(\frac{\pi}{3}\right)^n$

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

Hint- Use partial fraction decomposition.

Use the integral test to show converges or diverges.

14. $\sum_{n=2}^{\infty} \frac{1}{n\ln^2(n)}$

15. $\sum_1^\infty \frac{1}{n^2+6n+13}$

Use the comparison or limit comparison test to show convergence or divergence.

16. $\sum_{n=1}^{\infty} \frac{n^2+2}{4n^5-1}$

17. $\sum_1^\infty \frac{n-1}{n^2\sqrt{n}}$

Show whether the series converges or diverges.

18. $\sum_{n=1}^{\infty} \frac{\cos(n\pi)n^2}{n^2+1}$

19. $\sum_{n=0}^{\infty} \frac{(-1)^n 2^n}{n!}$

20. $\sum_{n=1}^{\infty} \frac{e^{2n}}{n^n}$

21. $\sum_1^{\infty} \left(\sqrt[n]{2} - 1\right)^n$

Determine the interval of convergence for the following power series.

22. $\sum_1^{\infty} \frac{(-1)^n x^n}{n^2}$

23. $\sum_1^{\infty} \frac{10^n x^n}{n^3}$

24. $\sum_1^{\infty} (-1)^n \frac{(x-3)^n}{2n+1}$

25. $\sum_1^{\infty} n!\,(2x-1)^n$

26. $\sum_1^{\infty} \frac{n! x^n}{1 \cdot 3 \cdot 5 \cdots (2n-1)}$