Math 122
Quiz 9 Review

Write out the first four non-zero terms for the Maclaurin series for:

1. $f(x) = \sin 2x$

2. $f(x) = x \sin x$

3. $f(x) = xe^x$

4. $f(x) = \frac{e^x}{1-x}$

5. $f(x) = \ln(1 + x^2)$

6. For the parametric curve: $x = 4t + 6$, $y = 8t + 2$, eliminate the parameter and express in rectangular form.

7. For the parametric curve: $x = 2 + 2\cos t, y = 3 + 4\sin t$, eliminate the parameter and express in rectangular form.

8. Find the equation of the tangent line to the curve $x = 2t^2 + 2t$, $y = 2t^2 + 4t$ at $t = 1$.

9. Find the equation of the tangent line to the curve $x = \sec t$, $y = \tan t$ at $t = \pi/4$.

10. Find $\frac{d^2y}{dx^2}$ if $x = \sin t, y = 2\cos t$.

11. Find the arc length of $x = 4\sin 2t$, $y = 4\cos 2t$, over the interval $0 \leq t \leq \frac{\pi}{2}$.

12. Find the arc length of $x = t^2$, $y = t^3$, from (1,1) to (4,8).

13. Find the arc length of $x = a(t - \sin t)$, $y = a(1 - \cos t)$. for $0 \leq t \leq 2\pi$

Answers

1. $\sin 2x = 2x - \frac{8x^3}{3!} + \frac{32x^5}{5!} - \frac{128x^7}{7!} + \dots$

2. $x \sin x = x^2 - \frac{x^4}{3!} + \frac{x^6}{5!} - \frac{x^8}{7!} + \dots$

3. $xe^x = x + x^2 + \frac{x^3}{2} + \frac{x^4}{3!} + \dots$

4. $\frac{e^x}{1-x} = 1 + 2x + \frac{5x^2}{2} + \frac{8x^3}{3} + \frac{65x^4}{24} + \dots$

5. $\ln(1+x^2) = x^2 - \frac{x^4}{2} + \frac{x^6}{3} - \frac{x^8}{4} + \dots$

6. $y = 2x - 10$

7. $\frac{(x-2)^2}{4} + \frac{(y-3)^2}{16} = 1$

8. $y = \frac{4}{3}x + \frac{2}{3}$

9. $y = \sqrt{2}x - 1$

10. $\frac{d^2y}{dx^2} = -2\sec^3 t$

11. 4π

12. $\frac{1}{27}(80\sqrt{10} - 13\sqrt{13})$

13. $8a$