1. Find the vertical asymptotes of \( f(x) = \frac{x^2 + 2x - 8}{x^2 - 4} \). (10%)

2. Find the equation of tangent line of \( f(x) = x^2 \) at \( x = -2 \). (10%)

3. Find the derivative of \( f(x) = 3x^2 \sin^2 x \). (10%)

4. Find the derivative of \( f(x) = x^2 \sqrt{1-x^2} \). (10%)

5. Prove \( \lim_{x \to \infty} \frac{\sin x}{x} = 0 \). (10%)

6. Find the limit: (16%)
   \[
   \frac{x^2 \cos 1}{\sin x}, \quad \text{(a)} \lim_{x \to 0} \frac{x}{\sin x}; \quad \text{(b)} \lim_{x \to 0} \sqrt{x^3}.
   \]

7. Find the interval of convergence of \( \sum_{i=1}^{\infty} \frac{(x-2)^i}{3^i i^2} \). (10%)

8. Find the tangent line to the folium of Descartes given by \( x^3 + y^3 = 3xy \) at the point \((3/2, 3/2)\). (12%)

9. Find the area of the region \( R \) bounded by the line \( y = \frac{1}{2} x \) and the parabola \( y^2 = 8 - x \). (12%)