1. Using appropriate trigonometric substitutions, evaluate
   
   (a) \( \int \frac{1}{(25 - x^2)^{3/2}} \, dx \). 
   
   (b) \( \int x^3 \sqrt{x^2 - 4} \, dx \).

2. (a) Use partial fraction to evaluate \( \int \frac{1}{x^2 - 5x + 6} \, dx \).

   (b) Write down (no need to find constants) the partial fraction decomposition of \( \frac{6x^2}{x^4 - 2x^2 - 8} \).

3. Briefly explain whether the following series is convergent.
   
   (a) \( \sum_{n=0}^{\infty} 7 \left( \frac{1}{3} \right)^n \)

   (b) \( \sum_{n=0}^{\infty} \frac{3n}{2n^2 + 4n - 2} \)

   (c) \( \sum_{n=0}^{\infty} \frac{2}{n^2 + 4} \)

4. Evaluate
   
   (a) \( \lim_{x \to 0} \frac{\arcsin x}{3x} \)

   (b) \( \lim_{x \to 1} \frac{\ln x}{x^2 - 1} \)

   (c) \( \lim_{x \to \infty} \left( 1 + \frac{5}{x} \right)^{2x} \)

   (d) \( \lim_{x \to 1} \frac{\arctan x}{x} \)

5. Write the recursive decimal 0.0\( \overline{23} \) as a geometric series and using the formula for the sum of a converging geometric series rewrite that as a fraction.

Bonus (only when you have time): \( \int \frac{6x^2}{x^4 - 2x^2 - 8} \)