

1) Evaluate the limit

$$\lim_{n \rightarrow \infty} (n - 1)^{1/n}.$$

2) Verify whether the series is convergent or divergent:

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

3) Find the sum of the series

$$\sum_{n=1}^{\infty} \left( \frac{1}{n} - \frac{1}{n+2} \right).$$

4) Write the repeating decimal 2.12121212... as a fraction of integer numbers.

5) Find the Taylor series of  $f(x) = \log_2(x)$  about  $x = 2$  (i.e., the series with powers of  $x - 2$ ). What is the radius of convergence of this power series?

6) Write

$$\frac{-6 - i2\sqrt{3}}{-3 + i\sqrt{3}}$$

in the polar form  $re^{i\theta}$  (i.e., compute  $r$  and  $\theta$ ).