Review:
- What is a sequence?
- What is a series?
- What is a divergent series?
- What is a convergent series?
- What is a Taylor series?

Tips:

$$\text{Partial sum:} \quad S_n = z_1 + z_2 + z_3 + ... + z_n \tag{1}$$

$$\text{Ratio test:} \quad \lim_{n\to\infty} \left| \frac{z_{n+1}}{z_n} \right| = L \tag{2}$$

$$\text{Root test:} \quad \lim_{n\to\infty} \sqrt[n]{|z^n|} = L \tag{3}$$

1.
Using partial sums, find the conditions on z for the following series to be convergent

$$\sum_{k=1}^{\infty} az^{k-1} \tag{4}$$

2.

(i) Define the terms *radius of convergence* and *circle of convergence*

(ii) For the series, find its radius of convergence

$$\sum_{k=1}^{\infty} (a_n)^k (z - j5)^k \qquad \text{where:} \quad a_n = \frac{12k+3}{4k+5} \tag{5}$$

3.

(i) What is a Maclaurin Series

(ii)What is its relation to a Taylor Series?

(iii) Why might we use it?

(iv) What is the formula for a Maclaurin Series?

4. Given that $z \in \mathbb{C}$, expand the following function into a Maclaurin series

$$f(z) = \frac{1}{1-z} \tag{6}$$