1 Power Series Practice

Problems like this were covered in Theoretical Mechanics. We will use these techniques in Static Fields. It's here for you to review, especially if you were not in Theoretical Mechanics.

(a) Calculate the $n = 0, 1, 2, 3, 4$ coefficients of the power series for $\cos z$ expanded around $z = \pi$. Using these coefficients, find a power series approximation for this function.

(b) Plot both the original function and your approximation.

(c) For what values of z is your approximation "good"?

2 Series Notation 1

Try this problem if you need some practice with summation notation for series.

Write out the first four nonzero terms in the series:

(a)

$$\sum_{n=0}^{\infty} \frac{1}{n!}$$

(b)

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

(c)

$$\sum_{n=0}^{\infty} (-2)^n \, \theta^{2n} \tag{1}$$

3 Series Notation 2

Try this problem if you need some practice with summation notation for series.

Write (a good guess for) the following series using sigma ($\sum$) notation. (If you only know a few terms of a series, you don't know for sure how the series continues.)

(a)

$$1 - 2\,\theta^2 + 4\,\theta^4 - 8\,\theta^6 + \ldots$$

(b)

$$\frac{1}{4} - \frac{1}{9} + \frac{1}{16} - \frac{1}{25} + \ldots$$