1 Taylor series approximation for cosine

A Taylor series can be used to create an approximation for a function, which we call a *power series approximation*. The Taylor series for cosine is:

$$\cos(\theta) = \sum_{i=0}^{\text{even}} \frac{(-1)^{i/2}}{i!}\theta^i \tag{1}$$

where the sum goes to ∞ over even values of i.

(a) Write a function that given θ and $i_{\max}$ computes the Taylor series of $\cos\theta$ including the terms up to and including $i = i_{\max}$.

(b) Test your function by printing $\cos(0.01)$ and a few approximations of this with moderate $i_{\max}$. Save these tests as part of your program.

(c) Plot $\cos\theta$ and be sure to label your axes.

(d) Plot your Taylor series approximation for $i_{\max}$ of 0, 1, 2, and 3. Use a legend to distinguish between your curves.