

## Math 102 — Taylor series

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**Problem 1.** Write out the first four non-zero terms of the Taylor series of  $f$  centered at  $c$  for the following examples.

a.  $f(x) = \sin x, c = \pi/2$

b.  $f(x) = \sqrt{x}, c = 4$

c.  $f(x) = \ln x, c = 2$

**Problem 2.** Find the sum of the following series by recognizing they are given by substituting a constant into a known Maclaurin series.

a.  $\sum_{n=0}^{\infty} \frac{2^n}{n!}$

b.  $\sum_{n=0}^{\infty} \frac{(-1)^n}{n!} 3^{2n}$

c.  $\sum_{n=0}^{\infty} (-1)^n \frac{\pi^{2n}}{(2n)!}$

d.  $\sum_{n=0}^{\infty} (-1)^n \frac{\pi^{2n+1}}{2^{2n+1}(2n+1)!}$

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