

BC Calculus
Review for Test # 10 (139–148)

139. The series $\sum_{n=1}^{\infty} (-1)^{n+1} \frac{x^n}{n}$ can be used to compute $\ln(1+x)$ if $|x| < 1$. Use this series to compute $\ln(1.5)$ with an error of less than 0.0001.
140. The projectile from a cannon with a muzzle velocity of 3000 ft/sec is supposed to strike a target 18,000 feet down range. A “dud” shell which only has a muzzle velocity of 2000 ft/sec is placed in the cannon. Where will this projectile land if the position of the barrel of the cannon is not changed?
141. Find the Taylor series for $\sin x$ expanded about $x = \pi/6$.
142. The position of a particle in the $x y$ plane is given by the function $\mathbf{P}(t) = (4 - 9t^2)\mathbf{i} + 3t\mathbf{j}$.
- A) Sketch the path of the particle in the $x y$ plane.
 - B) Sketch the position, velocity, and acceleration vectors of the particle at $t = 1$.
 - C) What is the speed of the particle at $t = 1$?
 - D) What is the magnitude of the acceleration of the particle at $t = 1$?
143. Find the Maclaurin series of $(1+x)^p$.
144. A) Write Taylor’s formula with remainder.
B) Write Lagrange’s form of the remainder.
C) Use a Taylor polynomial to find the S_3 approximation of $\cos 62^\circ$. Estimate the error in this approximation by using Lagrange’s form of the remainder.
145. A) Find the radius of convergence of $\sum_{n=0}^{\infty} \frac{x^n e^n}{n+1}$
B) Find the interval of convergence of $\sum_{n=0}^{\infty} \frac{n+1}{2n+1} \frac{(x-3)^n}{2^n}$
146. Find the Maclaurin series for:
- A) $\frac{1}{\sqrt{x+1}}$ B) $\sqrt{x+1}$ C) $\frac{1}{\sqrt{(x+1)^3}}$
147. A) **From memory** write the Maclaurin series for $\sin x$, $\cos x$, and e^x .
B) Write the Maclaurin series for $\sin(3x)$, $\cos x^3$, and e^{x^2} .
C) Find the Maclaurin series for $\arcsin x$.
148. Evaluate each of the following integrals **without** using a graphing utility.
- A) $\int_0^2 \frac{1}{\sqrt{x^2+1}} dx =$ B) $\int_0^1 \cos x^3 dx =$