

SECTION 6.4: WORKING WITH TAYLOR SERIES

(1) Write the Taylor Series of $f(x) = e^x$ at $a = 0$ either from memory or using the formula. State the interval of convergence.

(2) **The Point of this Section and Chapter 5 and 6:**

(3) Evaluate $\int_0^1 e^{x^2} dx$.

(4) (a) $f(x) = \sqrt{x+1}$

(b) $g(x) = \frac{1}{\sqrt[3]{1+x}}$

(5) Definition of $\binom{r}{n}$

(6) The Taylor Series for $f(x) = (1 + x)^r$.

(7) This is a step-by-step walk through problem # 234 from Section 6.4.

(a) Find the Taylor Series for $f(x) = \sin(x)$ at $a = 0$.

(b) Use the previous part to find the Taylor series for $f(x) = \sin(2x)$ at $a = 0$.

(c) Show that $\sin^2(x) = \int_0^x 2 \sin(t) \cos(t) dt$.

(d) (# 243) Use the fact that $\sin(2x) = 2 \sin(x) \cos(x)$ to find a power series representation for $\sin^2(x)$