

5. [10 points]

a. [5 points] Using an appropriate Taylor series for e^x , determine whether the integral

$$\int_0^1 \frac{1}{e^{\sqrt{x}} - 1} dx \quad \text{converges.}$$

Circle one: CONVERGES DIVERGES

Justification:

b. [5 points] Using a Taylor series for a function $f(x)$, compute the exact value of $\sum_{n=1}^{\infty} \frac{n}{3^{n-1}}$.

(Hint: Consider the function $\frac{1}{1-x}$.)

Answer: This is a value of a Taylor series for the function $f(x) =$ _____

The radius of convergence of this Taylor series is _____ (No justification needed)

Finally, $\sum_{n=1}^{\infty} \frac{n}{3^{n-1}} =$ _____