

1. Evaluate $\int \arccos x \, dx$

Hint: write $\arccos x = 1 - \arcsin x$ and integrate by parts.

2. Evaluate $\int \frac{x}{(x+1)^2} \, dx$

Hint: use partial fractions $\frac{a}{x+1} + \frac{b}{(x+1)^2}$.

3. Find the volume of the solid obtained by revolving the region bounded by $y = e^x$, $y = 0$, $x = 0$, and $x = 1$, about the y -axis.

4. Evaluate $\int_0^1 x(\ln x)^2 \, dx$

5. Evaluate $\int \frac{1}{x+\sqrt{x}} \, dx$

6. Determine whether the sequence is convergent or divergent:

$$a_n = n^{-n}$$

7. Find the radius of convergence of:

$$\sum_{n=0}^{\infty} n^2 e^{-n} x^n$$

8. Determine whether the series is convergent or divergent:

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^2}$$

9. Determine whether the series is convergent or divergent:

$$\sum_{n=0}^{\infty} \frac{1}{\sqrt{n^2+1}}$$

10. Find the Taylor series with center $c = 0$ of

$$f(x) = \sin(x^2)$$