

1. Use Simpson's rule with $n = 8$ to estimate $\int_1^3 \frac{dx}{x}$. Give a bound on the error in your estimate.
2. Find the length of the curve $y = \frac{e^x + e^{-x}}{2}$ for $0 \leq x \leq 1$.
3. Set up, but do not evaluate, an integral for the area of the surface generated when the part of the curve $y = \sin(\pi x)$ between $x = 0$ and $x = 1$ is revolved about the x -axis.
4. Compute $\int_{-\infty}^0 \frac{x+1}{(x-1)^2} dx$
5. Compute $\int_1^{10} \frac{1}{(x-2)^{\frac{2}{3}}} dx$
6. Waiting times at the TechSupport hotline are distributed exponentially. Records show that 25% of callers to TechSupport have to wait 5 minutes or less. What fraction of callers have to wait 10 minutes or more?
7. Find the exact value of $\sum_{n=1}^{\infty} (-1)^{n+1} \left(\frac{4}{7}\right)^n$
8. Determine whether each of the following series is convergent or divergent. Give reasons for your conclusions.
 - (a) $\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^3 + n}}$
 - (b) $\sum_{n=1}^{\infty} \cos\left(\frac{1}{n^2}\right)$
 - (c) $\sum_{n=0}^{\infty} \frac{n}{n^2 + 1}$
 - (d) $\sum_{n=1}^{\infty} \frac{\sqrt{n^2 + 2}}{n^2}$