

ABSOLUTE COOLNESS from sections 7.7 through 10.6

1. $\int_{-\infty}^0 e^x dx$ 2. $\int_2^{\infty} \frac{dx}{\sqrt{x}}$ 3. $\int_0^{10} \frac{1}{\sqrt[4]{10-x}} dx$

4. Find the arc length of $y = \frac{1}{3}x^{\frac{3}{2}}$ from $x = 0$ to $x = 60$.

5. Find the surface area resulting from rotating $f(x) = \frac{1}{\sqrt{x}}$ about the x-axis from $x = 1$ to $x = 3$.

6. Find the $T_3(x)$ Taylor Polynomial for $f(x) = \sqrt{x}$ centered at $x = 4$. Use your answer to approximate $\sqrt{5}$. What is the error of the T_3 Taylor approximation at $x = 5$?

7. Determine whether the following sequences converge. If the sequence converges, find its limit.

a. $A_n = \frac{n^{\frac{3}{2}}}{n^{\frac{3}{2}} + 1}$ b. $B_n = \frac{(-1)^n n^{\frac{3}{2}}}{n^{\frac{3}{2}} + 1}$

8. Find $\sum_{n=6}^{\infty} \frac{1}{(n-5)(n-4)}$

9. Find $\sum_{n=0}^{\infty} \frac{2(-5)^n}{3^{2n}}$

10. Use the Geometric Series Test to determine if $\sum_{n=1}^{\infty} \left(\frac{4}{3}\right)^{-n}$ converges. If it does, find its sum.

11. Use the Test for Divergence to determine if $\sum_{n=1}^{\infty} \frac{\sqrt{7n}}{n}$ diverges.

12. Use the p-series and comparison tests to determine convergence of $\sum_{n=1}^{\infty} \frac{\sqrt{7n}}{n}$.

13. Use the Leibniz Test to determine convergence of $\sum_{n=1}^{\infty} \frac{(-1)^n \ln n}{\sqrt{n}}$.

14. Use the Limit Comparison Test to determine convergence of $\sum_{n=1}^{\infty} \frac{n^2 + n - 1}{n^4 + 4n^2 - 3}$.

15. Use the Limit Comparison Test to determine convergence of $\sum_{n=1}^{\infty} \frac{1}{3^n - 2^n}$.

16. Use the Ratio Test to determine convergence of $\sum_{n=1}^{\infty} \frac{2^n}{n!}$.

17. Use the Ratio Test to determine convergence of $\sum_{n=1}^{\infty} \frac{(n!)^2}{(2n)!}$.