

1. Evaluate the following integrals.

(a) $\int x^3 \sqrt{1 - 4x^2} dx$

(b) $\int \frac{x + 11}{x^2 - 3x - 4} dx$

(c) $\int \frac{2x^3 + 3x^2 + 6x + 8}{x^2 + 1} dx$

(d) $\int e^{3x} \sin x dx$

(e) $\int \cos^2 5x dx$

(f) $\int \ln(\sqrt{x}) dx$

(g) $\frac{\tan^4 x + 1}{\cos^2 x}$

(h) $\int x^4 e^{-x} dx$

2. Find the area of the region between the x -axis and the graph of $f(x) = \frac{1}{x\sqrt{\ln x}}$ on the interval $[3, \infty)$.
3. Find a general formula for a_n , the n th term of the following sequence. Does this sequence converge or diverge? Explain. If the sequence converges, be sure to find its limit.

?, ?, ?, ?, ?, ?...

4. Prove that the sequence below is either strictly increasing or strictly decreasing.

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