

- Please see the course webpage for the answer key.

Compute each of the following Integrals.

1. $\int_{-4}^{-3} \frac{8-x}{x^2+2x-8} dx$

2. $\int_0^e \ln x dx$

3. $\int_0^1 \frac{e^{\frac{1}{x}}}{x^2} dx$

4. $\int_{-1}^0 \frac{e^{\frac{1}{x}}}{x^2} dx$

5. $\int_0^{\frac{1}{2}} \frac{1}{x \ln x} dx$

6. $\int_1^2 \frac{1}{x \ln x} dx$

7. $\int_0^e x^2 \ln(x^2) dx$

8. $\int_0^{e^5} \frac{1}{x(25+(\ln x)^2)} dx$

Determine whether each of the following Sequences Converge or Diverge.

9. $\left\{ \frac{3n^7 - 2n + 1}{8n^7 + 9} \right\}_{n=1}^{\infty}$

10. $\left\{ n^2 \sin\left(\frac{1}{n^2}\right) \right\}_{n=1}^{\infty}$

11. $\left\{ \arctan\left(\frac{n^7 + 7}{\sqrt{3n^7 + 1}}\right) \right\}_{n=1}^{\infty}$

12. $\left\{ \frac{n^7}{\ln n} \right\}_{n=5}^{\infty}$

13. $\left\{ \frac{(n+2)!}{(n-1)!} \right\}_{n=1}^{\infty}$

14. $\left\{ \frac{n^2}{e^n} \right\}_{n=2}^{\infty}$

15. $\left\{ \left(1 - \arcsin\left(\frac{5}{n^3}\right)\right)^{n^3} \right\}_{n=1}^{\infty}$

16. $\left\{ \left(\frac{n+1}{n}\right)^n \right\}_{n=1}^{\infty}$

17. $\left\{ \frac{(n+7)^9}{(n+6)^9} \right\}_{n=1}^{\infty}$

18. $\left\{ \frac{(2n-1)!}{(2n+1)!} \right\}_{n=1}^{\infty}$