• Please see the course webpage for the answer key.

Compute each of the following Integrals.

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

2. $\displaystyle\int_{0}^{e} \ln x\,dx$

3. $\displaystyle\int_{0}^{1} \frac{e^{\frac{1}{x}}}{x^2}\,dx$

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

5. $\displaystyle\int_{0}^{\frac{1}{2}} \frac{1}{x\ln x}\,dx$

6. $\displaystyle\int_{1}^{2} \frac{1}{x\ln x}\,dx$

7. $\displaystyle\int_{0}^{e} x^2\ln\left(x^2\right)\,dx$

8. $\displaystyle\int_{0}^{e^5} \frac{1}{x\left(25+(\ln x)^2\right)}\,dx$

Determine whether each of the following Sequences Converge or Diverge.

9. $\left\{\dfrac{3n^2-2x+1}{5n^2+9}\right\}_{n=1}^{\infty}$

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

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

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

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

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

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

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

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

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