

MTH 1126 - Test #4
SPRING 2024 - 11AM CLASS

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Name _____

Show CLEARLY how you arrive at your answers.

In Exercises 1-2, Determine convergence/divergence. If the integral converges, find its value.

1. $\int_7^{\infty} \frac{1}{(x+2)^{\frac{3}{2}}} dx =$

2. $\int_5^9 \frac{1}{(x-5)^{\frac{1}{2}}} dx =$

3. Determine convergence/divergence of the sequence whose n^{th} term is given by:

$$a_n = \frac{3n}{n+2}.$$

i.e., Determine convergence/divergence of the sequence

$$\left\{ \frac{3n}{n+2} \right\}_{n=1}^{\infty} = \left\{ 1, \frac{3}{2}, \frac{9}{5}, 2, \frac{15}{7}, \frac{9}{4}, \dots, \frac{3n}{n+2}, \dots \right\}.$$

4. Determine convergence/divergence of the given series. (Justify your answer!) **If the series converges, determine its sum.**

$$\sum_{n=2}^{\infty} \frac{2}{n^2-1} = \frac{2}{3} + \frac{2}{8} + \frac{2}{15} + \dots$$

In Exercises 5-6, determine convergence/divergence of the given series. (Justify your answers!) **If the series converges, determine its sum.**

5. $1 + \frac{2}{3} + \frac{4}{9} + \frac{8}{27} + \dots + \left(\frac{2}{3}\right)^n + \dots$

6. $\sum_{n=1}^{\infty} \frac{n+1}{2^n} =$

In Exercises 7-9, determine convergence/divergence of the given series. (Justify your answers!)

$$7. \sum_{n=1}^{\infty} \frac{1}{2n^3-1}$$

$$8. \sum_{n=0}^{\infty} \frac{1}{n+3}$$

9. Determine convergence/divergence of the given series. (Justify your answer!)

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{1}{3n-1} = \frac{1}{2} - \frac{1}{5} + \frac{1}{8} - \frac{1}{11} + \dots$$

For exercises 10-11, choose one. (You can do the other for extra credit. (10 points))

10. Determine convergence/divergence of the given series. (Justify your answer!)

$$\sum_{n=1}^{\infty} \left(\frac{6n+2}{n+2}\right)^n$$

11. Determine convergence/divergence of the given series. (Justify your answer!)

$$\sum_{n=1}^{\infty} \frac{n!}{5^n}$$