

MTH 1126 - Test #4 - Version 1
SPRING 2022

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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. $\int_6^{\infty} \frac{1}{(x-2)^{\frac{3}{2}}} dx =$

2. $\int_2^6 \frac{1}{(x-2)^{\frac{1}{2}}} dx =$

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

$$a_n = \cos\left(\frac{n\pi}{2}\right). \text{ (i.e., Determine convergence/divergence of the sequence } \left\{\cos\left(\frac{n\pi}{2}\right)\right\}_{n=1}^{\infty} = \{0, 1, 0, -1, \dots\}.)$$

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

$$\sum_{n=1}^{\infty} \frac{1}{n^2+5n+6} =$$

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

5. $1 + \frac{3}{5} + \frac{9}{25} + \frac{27}{125} + \dots + \left(\frac{3}{5}\right)^n + \dots$

6. $\sum_{n=1}^{\infty} \frac{n}{n+5} =$

In Exercises 7-8, determine convergence/divergence of the given series. (Justify your answers!)

$$7. \sum_{n=4}^{\infty} \frac{1}{n^{\frac{1}{2}}-1}$$

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

For exercises 9-10, choose one. (You can do the other for extra credit. (10 points))

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

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

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

$$\sum_{n=1}^{\infty} \frac{2^n}{n!}$$

Extra Wow! (10 points)

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

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