MTH 112 Test 4
Fall 2020

Name ____________________

Calculus II

When finished submit your answers at **https://pryor.mathcs.wilkes.edu/submissions**.
If you feel the answer is none of the choices given, submit no answer to the question.

1. Find the sum - $\sum_{k=1}^{\infty} \frac{8(2^k)}{3^{k+1}}$ $\frac{16}{3}$

$\sum_{k=1}^{\infty} \frac{1}{k^3}$ converges since it is asymptotic to a converging *p*-series. So a correct answer to this problem would be **CB** - using C or D for Converge or Diverge and the key below for your reason.

(A) zero divergence test
(B) asymptotic to a converging *p*-series
(C) asymptotic to a diverging *p*-series
(D) alternating series test
(E) ratio test
(F) dominated by a convergent series
(G) dominates a divergent series
(H) integral test

Use the coding as above to describe the behavior of the series in problems 2 through 9.

2. $\sum_{k=0}^{\infty} (-1)^k \frac{2k+1}{2^k}$ **CD**

3. $\sum_{k=0}^{\infty} \frac{1}{\sqrt{k^2+4}}$ **DC**

4. $\sum_{k=0}^{\infty} \frac{k(k+2)}{3^k}$ **CE**

5. $\sum_{k=0}^{\infty} \frac{\sqrt{k}}{k^2+1}$ **CB**

6. $\sum_{k=0}^{\infty} \frac{k!}{\ln k}$ **DA or DE or DG**

7. $\sum_{k=1}^{\infty} ke^{-k^2}$ **CH**

8. $\frac{1}{3^2} + \frac{2!}{3^4} + \frac{3!}{3^6} + \frac{4!}{3^8} + \ldots$ **DA**

9. $\frac{1}{3} + \frac{1}{\sqrt{3}} + \frac{1}{\sqrt[3]{3}} + \frac{1}{\sqrt[4]{3}} + \ldots$ **DA or DE**

10. Find the interval of convergence for $\sum_{k=1}^{\infty} \frac{(-1)^k 4^k}{k\sqrt{k}}$ $\left[-\frac{1}{4}, \frac{1}{4}\right]$.

11. After expanding $\operatorname{arcsinh} x$ into a power series in x by using the formula $\int_0^x \frac{1}{\sqrt{1+t^2}}\,dt$,

provide the coeeficient of the third nonzero term? Remember

$$\sum_{k=1}^{\infty} x^k = \frac{1}{1-x} \text{ for } |x| < 1 \qquad +\frac{3}{40}x^5$$

12. Use the first two (2) non zero terms from the Maclaurin series expansion of e^x to evaluate

$$\int_1^2 e^x \ln x \, dx \qquad \frac{1}{4} + \ln 4$$