

Name _____ Test 1, Spring 2019

1) Write out the first 4 terms of the series below. (4 points)

$$\sum_{k=0}^{\infty} \frac{1}{10^k}$$

2) Find the summation below. You do not need to simplify your answer. (4 points)

$$\sum_{k=0}^{473} \frac{1}{10^k}$$

3) Write out the first 4 terms of the sequence below. (4 points)

$$\left\{ \frac{1}{10^n} \right\}$$

4) What does the sequence in the above question converge to? (4 points)

5) Find the integral below. (8 points)

$$\int \tan^3(x) dx$$

6) Find the integral below. (8 points)

$$\int \frac{1}{1 - \sqrt{x}} dx$$

7) Find the integral below. (8 points)

$$\int x \ln(x^2) dx$$

8) Find the integral below. (8 points)

$$\int_2^{\infty} \frac{1}{\sqrt{x}} dx$$

9) Find the integral below. (8 points)

$$\int \frac{1}{(1-x^2)^{\frac{3}{2}}} dx$$

10) Find the integral below. (8 points)

$$\int \frac{x^2 + 20x - 15}{x^3 + 4x^2 - 5x} dx$$

11) Hourly temperature data in Fictoria is given over a 4 hour period. Assume the data comes from a continuous temperature function $T(t)$. Using the midpoint rule, find a good approximation of the average temperature during that time, $\frac{1}{4} \int_0^4 T(t) dt$. Write out the formula you would plug in a calculator, do not simplify your answer. (6 points)

t	$T(t)$
0	15
1	17
2	18
3	21
4	22

12) Give the appropriate form of the partial fraction decomposition for the following function. (6 points)
DO NOT DO ANY WORK TO SOLVE IT; I ONLY WANT TO SEE THE "FORM" WITH VARIABLES a, b, c , ETC.

$$\frac{2x^2 + 3}{(x^2 - 8x + 16)(x^2 + 3x + 4)}$$

13) Determine whether the series converges or diverges. Circle which test(s) you use. (8 points)

[Divergence Test] [Integral Test] [Comparison Test] [Limit Comparison Test] [Ratio Test] [Root Test] [Geometric Series] [p-Series]

$$\sum_{k=5}^{\infty} \frac{\sqrt{k}}{(\ln(k))^7}$$

14) Determine whether the series converges or diverges. Circle which test(s) you use. (8 points)

[Divergence Test] [Integral Test] [Comparison Test] [Limit Comparison Test] [Ratio Test] [Root Test] [Geometric Series] [p-Series]

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

15) Determine whether the series converges or diverges. Circle which test(s) you use. (8 points)

[Divergence Test] [Integral Test] [Comparison Test] [Limit Comparison Test] [Ratio Test] [Root Test] [Geometric Series] [p-Series]

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