

Math 101 Tutorial Worksheet 9

There is no associated quiz due on BrightSpace for this tutorial worksheet

1. Find the sum of the series:

$$1 - \ln 2 + \frac{(\ln 2)^2}{2!} - \frac{(\ln 2)^3}{3!} + \frac{(\ln 2)^4}{4!} - \dots$$

2. Using a series representation of $\sin 3x$, find the values of a and b for which

$$\lim_{x \rightarrow 0} \left[\frac{\sin 3x}{x^3} + \frac{a}{x^2} + b \right] = 0$$

3. Use series to evaluate the following limits:

(a) $\lim_{t \rightarrow 0} \frac{1 - \cos t}{1 + t - e^t}$

(b) $\lim_{s \rightarrow 0} \frac{\sin s + \frac{1}{6}s^3 - s}{s^5}$

(c) $\lim_{r \rightarrow 0} \frac{1 - \cos^2 r}{\ln(1 - r) + \sin r}$

4. Evaluate the indefinite integral

$$\int \frac{e^t - 1}{t} dt$$

as an infinite series.

5. Find the Maclaurin series for the function defined by:

$$\int_0^t \cos x^3 dx$$

6. Determine the Maclaurin expansion for $f(z) = \tan^{-1}(z)$ and use it to approximate π .