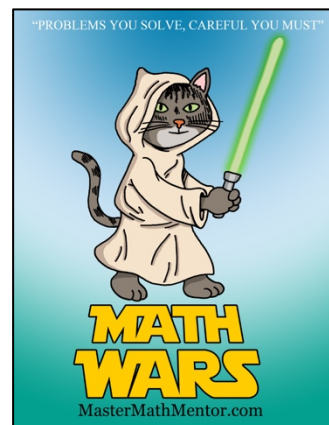


Math Wars – BC Calculus Scrambled # 263

Maximum Time: 8.5 Minutes



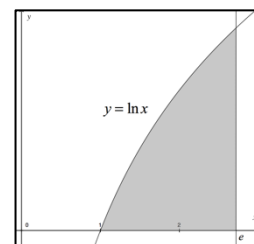
1. (1 pts) Let $f(x)$ be a positive, continuous, decreasing function. Suppose

$$\int_1^{\infty} f(x) dx = 100. \text{ Which of the following must be true about } \sum_{n=1}^{\infty} f(n)?$$

- A. it converges
- B. it converges and is greater than 100
- C. it converges and is less than 100
- D. it diverges

2. (3 pts) Find the area of the shaded region.

- A. 1
- B. e
- C. $e + 1$
- D. $e - 1$



3. (5 pts) A particle moving along a curve in the xy -plane has position $(x(t), y(t))$ at time $t \geq 0$ with

$$\frac{dx}{dt} = e^{t^2-4t+3} - 1 \text{ and } \frac{dy}{dt} = t^2 - t. \text{ For what value(s) of } t \text{ is the particle stopped?}$$

- I. $t = 0$
- II. $t = 1$
- III. $t = 3$

- A. I only
- B. II only
- C. I and III only
- D. II and III only

4. (7 pts) The value of $\tan^{-1} 1 - \sin 1$ is approximated by the 5th degree Taylor polynomial centered at 0. Find the fraction that represents this difference.

- A. $\frac{43}{120}$
- B. $\frac{23}{120}$
- C. $\frac{1}{40}$
- D. 0

5. (9 pts) The function f is defined by the power series $1 + \frac{x}{2} + \frac{x^2}{3} + \frac{x^3}{4} + \dots$ for all real numbers x for which the series converges. Which of the following values for x lie within the function's interval of convergence?

- I. $x = 1$
- II. $x = -\frac{9}{10}$
- III. $x = -1$