

## Course outline

How does an NPTEL online course work?

Week 1: Real number system and Limits

Week 2: Continuity and Differentiation of functions

Week 3: Plotting graph of functions

Week 4: L'Hospital Rule and Integration

● Lecture 16: Optimization and L'Hospital Rule

● Lecture 17: L'Hospital Rule continued and Cauchy Mean value theorem

● Lecture 18: Approximation of Roots

● Lecture 19: Antiderivative and Riemann Integration

● Lecture 20: Riemann's criterion for Integrability

 Quiz : Assignment 4

● Feedback For Week 4

● Assignment 4 Solution

Week 5: Integration and its numerical methods

Week 6: Applications of Integration

Week 7: Improper Integrals, Sequences and Series

Week 8: Series and its convergence

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# Assignment 4

The due date for submitting this assignment has passed.

**Due on 2021-02-17, 23:59 IST.**

As per our records you have not submitted this assignment.

 1) A rectangle is to be inscribed in a semicircle of radius  $2\text{ cm}$ . What is the largest area the rectangle can have?

**1 point**

- $1\text{ cm}^2$   
  $2\text{ cm}^2$   
  $3\text{ cm}^2$   
  $4\text{ cm}^2$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $4\text{ cm}^2$ 

 2) The point on the parabola  $x^2 = 2y$  closest to the point  $(4,1)$  is

**1 point**

- $(2, 2)$   
  $(\sqrt{2}, 1)$   
  $(-2, 2)$   
  $(2\sqrt{2}, 4)$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $(2, 2)$ 

 3) The value of  $\lim_{x \rightarrow 0} \frac{(x^3 - 2x^2 + 6)(x - \sin x)}{x^3}$  is

**1 point**

- 0  
 1  
 -1  
  $\infty$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
1

 4) The value of  $\lim_{x \rightarrow \infty} (x - \sqrt{x^2 - x})$  is

**1 point**

- 0  
  $\frac{1}{2}$   
 1  
  $\infty$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $\frac{1}{2}$ 

 5) The value of  $\lim_{x \rightarrow \infty} \left(1 + \frac{1}{x^2} - \frac{1}{x^3}\right)^{x^2}$  is

**1 point**

- 0  
  $e$   
  $e^{-1}$   
  $\infty$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $e$ 

 6) Let  $(a, b)$  be the point where the curve  $y = x^3 - x$  crosses the line  $y = 1$ . Applying Newton-Raphson method, find the second approximate of  $a$  upto four decimal places. **0 points**

- 1.2312  
 1.3269  
 1.3478  
 1.4001

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
1.3478

 7) The indefinite integral  $\int \frac{x^3 dx}{\sin(x^4)}$  is

**1 point**

- $\frac{1}{4} \operatorname{cosec} x + C$   
  $\frac{1}{4} \ln |\operatorname{cosec} x^4 - \cot x^4| + C$   
  $\frac{1}{4} \ln |\operatorname{cosec} x - \cot x| + C$   
  $\frac{1}{4} \ln |(\operatorname{cosec} x)^4 - (\cot x)^4| + C$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $\frac{1}{4} \ln |\operatorname{cosec} x^4 - \cot x^4| + C$ 

 8) The value of  $\lim_{\|P\| \rightarrow 0} c_k (c_k^2 - 1)^{\frac{1}{3}} \Delta x_k$ , where  $P = \{0 = x_0 < x_1 < \dots < x_n = 1\}$  is a partition of  $[0, 1]$  with  $\Delta x_k = x_k - x_{k-1}$  and  $c_k \in (x_{k-1}, x_k)$  is

**1 point**

- $-\frac{1}{8}$   
  $-\frac{3}{8}$   
  $\frac{1}{8}$   
  $\frac{3}{8}$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $-\frac{3}{8}$ 

 9) The value of  $\lim_{n \rightarrow \infty} \sum_{k=1}^n \frac{1}{n} \cos\left(\frac{\pi k}{2n}\right)$  is

**1 point**

- $\frac{\pi}{2}$   
  $-\frac{\pi}{2}$   
  $\frac{2}{\pi}$   
  $-\frac{2}{\pi}$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $\frac{2}{\pi}$ 

 10) The value of  $\int_0^3 (x - [x]) dx$ , where  $[x]$  is the greatest integer function less than or equal to  $x$ , is

**1 point**

- 0  
  $\frac{1}{2}$   
 1  
  $\frac{3}{2}$

 No, the answer is incorrect.  
Score: 0

 Accepted Answers:  
 $\frac{3}{2}$