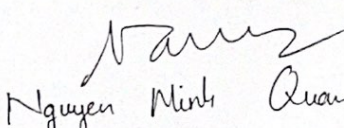
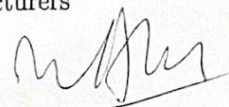


## MIDTERM TEST

Semester 2, 2020-21 • Duration: 90 minutes

SUBJECT: Calculus II	
Department of Mathematics  Nguyen Minh Quan	Lecturers  N. A. Tu, P. T. Duong

**Instructions:** Each student is allowed a maximum of two double-sided sheets of reference material (of size A4 or similar). All other documents and electronic devices, except scientific calculators and dictionaries, are not allowed.

Question 1. [10 pts] Find

$$\lim_{n \rightarrow \infty} (\sqrt{n+1} - \sqrt{n}). \quad 0 \frac{1}{2}$$

Question 2. [10 pts] Evaluate the following series

$$\sum_{n=2}^{\infty} 2^{-2n+1}. \quad \frac{1}{6}$$

Question 3. [10 pts] Determine whether the series converges or diverges

$$\sum_{n=1}^{\infty} \frac{n^2}{2^n}. \quad \text{conv}$$

Question 4. [10 pts] Find the radius of convergence and interval of convergence of the series

$$(-3, 3) \quad \sum_{n=1}^{\infty} (-1)^n \frac{n^2 x^n}{3^n}. \quad \frac{4(-5) + 6(12)}{\sqrt{L}}$$

Question 5. [10 pts] Find the scalar and vector projections of  $\mathbf{b} = (4, 6)$  onto  $\mathbf{a} = (-5, 12)$ .

Question 6. [10 pts] Find the volume of the parallelepiped with sides  $\mathbf{a} = (2, 1, 0)$ ,  $\mathbf{b} = (1, 1, 2)$  and  $\mathbf{c} = (0, -1, 1)$ .  $5$   $\text{conv } C = \frac{5}{\sqrt{2}}$   $\sqrt{(-2, 4, 1)}$

Question 7. [10 pts] Write the equation of the plane that contains the line  $x = 1+t$ ,  $y = 2-t$ ,  $z = 4-3t$  and is parallel to the plane  $5x + 2y + z = 1$ .  $-13$

Question 8. [10 pts] Find  $\lim_{t \rightarrow 1} \left( \frac{t^2 - t}{t - 1} \mathbf{i} + \sqrt{t+8} \mathbf{j} + \frac{\sin \pi t}{\ln t} \mathbf{k} \right)$ .  $-260 \quad 624$

Question 9. [10 pts] Find the length of the curve whose vector equation is given by

$$\mathbf{r}(t) = \mathbf{i} + t^2 \mathbf{j} + t^3 \mathbf{k}, \quad 0 \leq t \leq 1. \quad \frac{1}{27} (13)^{3/2} - \frac{1}{27} (4)^{3/2}$$

Question 10. [10 pts] Find the Taylor polynomial  $T_4(x)$  of  $f(x) = \cos(\pi x)$  at  $a = 1$ .

— END of TEST —