

Polytechnic University of the Philippines

Sta. Mesa, Manila

MATH 101 (CALCULUS 1)

Pre-Test 1

Name: Mark Gerald Guerrero Score: _____

Year and Section: DCPET 1-2 Date: 04/27/24

Professor: Prof. Oscar Poloyapoy Remarks: _____

General Directions: Solve the problems on a separate paper. Put your final answer in a box. Write your final answer on the **Answer SHEET**. Submit your solution together with the **Answer Sheet**.

Part A.

Directions: Using the definition of limit as $\lim_{x \rightarrow a} f(x) = L$ if and only if for any chosen $\epsilon > 0$, $\exists \delta > 0$, such that whenever $0 < |x - a| < \delta$ then $0 < |f(x) - L| < \epsilon$. Find the value of δ & ϵ for the following equations. Write your final answer on the **Answer Sheet**. Prepare short bond paper for your solution and submit it in **PDF**. Each item is equivalent to **four (4) points**. Always double check your work. Keep cool!

1. Find $\delta > 0$ and $\epsilon > 0$ for the $\lim_{x \rightarrow 3} (5x + 4) = 19$, such that $0 < |f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$. $\delta =$ $\epsilon =$

2. Find $\delta > 0$ and $\epsilon > 0$ for the $\lim_{x \rightarrow 2} (-4x + 6) = -2$, such that $0 < |f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$. $\delta =$ $\epsilon =$

3. Find $\delta > 0$ and $\epsilon > 0$ for the $\lim_{x \rightarrow 5} (x + 10) = 15$, such that $0 < |f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$. $\delta =$ $\epsilon =$

4. Find $\delta > 0$ and $\epsilon > 0$ for the $\lim_{x \rightarrow 1} \left(\frac{2x^2 - 8}{x + 2} \right) = L$, such that $0 < |f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$. $\delta =$ $\epsilon =$

5. Find $\delta > 0$ and $\epsilon > 0$ for the $\lim_{x \rightarrow -2} (3x - 2) = -8$, such that $0 < |f(x) - L| < \epsilon$ whenever $0 < |x - a| < \delta$. $\delta =$ $\epsilon =$

Part B.

Directions: Evaluate the following limits as indicated. Each item is equivalent to **four (4) points**. Write your final answer on the **Answer Sheet**. Prepare short bond paper for your solution and submit it in **PDF**. All your answers must be expressed in fraction of the lowest term or simplified radicals. Always double check your work. Keep cool!

6. $\lim_{x \rightarrow -1} (4x^5 - 3x^4 + 2x^3 - 5x^2 + 2x - 10)$ -26

7. $\lim_{x \rightarrow 0} \frac{2x^2 + 1}{x^3 + 3x - 4}$ -1/4

8. $\lim_{y \rightarrow 2} \frac{3y^2 - 4y + 2}{y^3 - 5}$ 2

9. $\lim_{w \rightarrow 1} \frac{w^2 - 1}{w^2 + 3w - 4}$ -1

10. $\lim_{x \rightarrow 2} \frac{x^4 + 2x^3 - 4x^2 - 5x - 6}{2x^4 + x^3 - 10x^2 - x - 18}$ 0

11. $\lim_{x \rightarrow 1} \frac{(1-x^2)^{\frac{1}{3}}}{(1-x^3)^{\frac{1}{3}}}$ 0

12. $\lim_{x \rightarrow 1} \frac{\sqrt{1-x^3}}{\sqrt{1-x^2}}$ 1.22

13. $\lim_{x \rightarrow 8} \frac{\sqrt{7 + \sqrt[3]{x}} - 3}{x - 8}$ 0

14. $\lim_{x \rightarrow 1} \frac{\sqrt{6+x} - \sqrt{7}}{x - 1}$ 0

15. $\lim_{x \rightarrow -5} \frac{x+5}{\sqrt{x^2-5}}$ 0

$$16. \quad \lim_{x \rightarrow \infty} \frac{(\sqrt[3]{2x^{20}} - \sqrt[3]{3x^{10}} + \frac{1}{3}x^5 + x - 25)}{(\sqrt{5x^{15}} - \sqrt{2x^{10}} + 4x^5 - x + 10)}$$

$$17. \quad \lim_{x \rightarrow \infty} \frac{(10x^{14} + 5x^{10} - 6x^5 + 2x^2 - x + \sqrt{3})}{(5x^{15} - 3x^{12} + 2x^{10} - 5x^5 + 3x^2 + x - 1)}$$

$$18. \quad \lim_{x \rightarrow \infty} \frac{(\sqrt{3}x^{12} - 2x^{10} + 5x^8 - 6x^6 + 2x^4 - 7x^2 - 9)}{(\sqrt{2}x^{12} - 3x^9 - 6x^5 + 8x^3 - x^2 + x - 10)}$$

$$19. \quad \lim_{n \rightarrow \infty} \frac{3n^2 - 5n}{5n^2 + 2n - 6}$$

$$20. \quad \lim_{n \rightarrow \infty} (\sqrt{n+1} - \sqrt{n})$$

0

Part C.

Directions: This is a challenge problems equivalent to **five (5) points** each. Evaluate the following limits such as your answer can be expressed as **simple thought**. Show your solution on a bond paper. Write also your final answer on the **Answer Sheet**

$$21. \quad \lim_{x \rightarrow LIM} (RYOMA)x$$

(RYOMA)LIM

$$22. \quad (Ad)\lim_{x \rightarrow 0} (\ln e^{caven}) = (-ya) \lim_{x \rightarrow 0} (\ln^{pHp} e) - (alV) \lim_{x \rightarrow 0} (e. n. \ln e^{10})$$

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ANSWER SHEET

Strictly No Erasures

Part A	9. -1
1. $\delta =$ <input type="text"/>	10. 0
$\epsilon =$ <input type="text"/>	11.
2. $\delta =$ <input type="text"/>	12. 1.22
$\epsilon =$ <input type="text" value=" x-2 <3"/>	13. 0
3. $\delta =$ <input type="text"/>	14. 0
$\epsilon =$ <input type="text"/>	15. 0
4. $\delta =$ <input type="text"/>	16.
$\epsilon =$ <input type="text" value=" x-5 <2"/>	17.
5. $\delta =$ <input type="text"/>	18.
$\epsilon =$ <input type="text" value=" x+2 <3"/>	19.
Part B.	20. 0
6. -26	Part C.
7. -1/4	21. (RYOMA)LIM
8. 2	22.