

First Name: \_\_\_\_\_ Last Name: \_\_\_\_\_

Student-No: \_\_\_\_\_ Section: \_\_\_\_\_

**Very short answer questions**

1. 2 marks Each part is worth 1 marks. Please write your answers in the boxes.

(a) Find the domain of continuity for the function  $f(x) = \frac{1}{\sqrt{x^2 - 4}}$ .

Answer:

(b) Evaluate  $\lim_{x \rightarrow +\infty} \frac{2x^3 + 4x - 3}{7x^2 + 1}$ .

Answer:

**Short answer questions — you must show your work**

2. 4 marks Each part is worth 2 marks.

(a) Evaluate  $\lim_{x \rightarrow -\infty} \frac{\sqrt{x^2 + 3} - x}{2x - 7}$

- (b) Find a value of  $c$  such that the following function is continuous at  $x = c$ :

$$f(x) = \begin{cases} \sin(cx) & \text{if } x \leq c \\ \cos(cx) & \text{if } x > c \end{cases}$$

**Long answer question — you must show your work**

3. 4 marks Show that there exists a real number such that  $c^{-3} = \cos(c)$ .

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**Very short answer questions**

1. 2 marks Each part is worth 1 marks. Please write your answers in the boxes.

(a) Find the domain of continuity for the function  $f(x) = \sqrt{x^2 - 1}$ .

Answer:

(b) Evaluate  $\lim_{x \rightarrow +\infty} \frac{5x^2 - 3x + 1}{3x^2 + x + 7}$ .

Answer:

**Short answer questions — you must show your work**

2. 4 marks Each part is worth 2 marks.

(a) Evaluate  $\lim_{x \rightarrow -\infty} \frac{3x + 5}{\sqrt{x^2 + 5} - x}$

(b) Find all values of  $c$  such that the following function is continuous at  $x = c$ :

$$f(x) = \begin{cases} 8 - cx & \text{if } x \leq c \\ x^2 & \text{if } x > c \end{cases}$$

**Long answer question — you must show your work**

3. 4 marks Show that there exists at least one real number  $c$  such that  $2 \tan(c) = c + 1$ .

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**Very short answer questions**

1. 2 marks Each part is worth 1 marks. Please write your answers in the boxes.

(a) Describe all points for which the function is continuous:  $f(x) = \frac{1}{x^2 - 1}$ .

Answer:

(b) Evaluate  $\lim_{x \rightarrow +\infty} \frac{5x^2 + 10}{3x^3 + 2x^2 + x}$ .

Answer:

**Short answer questions — you must show your work**

2. 4 marks Each part is worth 2 marks.

(a) Evaluate  $\lim_{x \rightarrow -\infty} \frac{5x + 7}{\sqrt{4x^2 + 15} - x}$

(b) Find all values of  $c$  such that the following function is continuous at  $x = c$ :

$$f(x) = \begin{cases} 6 - cx & \text{if } x \leq 2c \\ x^2 & \text{if } x > 2c \end{cases}$$

**Long answer question — you must show your work**

3. 4 marks Show that there exists at least one real number  $c$  such that  $3^c = c^2$ .

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**Very short answer questions**

1. 2 marks Each part is worth 1 marks. Please write your answers in the boxes.

(a) Find the domain of continuity for the function  $f(x) = \sqrt{4 - x^2}$ .

Answer:

(b) Evaluate

$$\lim_{x \rightarrow +\infty} \frac{\sqrt{2x^4 + 4x - 3}}{3x^2 + 1}.$$

Answer:

**Short answer questions — you must show your work**

2. 4 marks Each part is worth 2 marks.

(a) Evaluate  $\lim_{x \rightarrow -\infty} \frac{\sqrt{9x^2 + x} - 3x}{x + 1}$

(b) Find a value of  $c$  such that the following function is continuous at  $x = c$ :

$$f(x) = \begin{cases} \sin(x) \cos(x) & \text{if } x \leq c \\ \cos(x) & \text{if } x > c \end{cases}$$

**Long answer question — you must show your work**

3. 4 marks Show that there exists a real number  $c$  such that  $2^c = 2 \tan(\pi c)$ .