

Check Your Knowledge 1

⚠ This is a preview of the published version of the quiz

Started: Oct 12 at 7:43am

Quiz Instructions

Complete this ungraded quiz to help you to estimate your mastery of the course material. I can also see which questions students are having trouble with so I can go over the material again in class or in recitation.

Keep in mind

- Practice test is not timed but the midterm and final will be.
 - On the midterm and final some questions may require you to show your work.
 - Multiple attempts are not permitted on the practice test.
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Considering $f : \mathbb{R} \rightarrow \mathbb{R}$ with $\lim_{x \rightarrow \infty} \frac{f(x) + 2x^2 \sin(1/x)}{x - \sqrt{x^2 + 1}} = 2$.

- i. Find $\lim_{x \rightarrow \infty} \frac{f(x)}{x}$
- ii. If $\lim_{x \rightarrow \infty} [f(x) + 2x] = -3$, find $\lim_{x \rightarrow \infty} \frac{f(x) + x + 2}{xf(x) + 2x^2 - 3}$
- iii. Find $\lim_{x \rightarrow \infty} \frac{|f^3(x) - 1| + 3}{f(x) + 5}$

Question 1**1 pts**

i.

☐ $-2/3$

☐ $3/2$

☐ -2

☐ -5

Question 2**1 pts**

ii.

☐ $\sqrt{5}$

☐ $-1/2$

☐ $+\infty$

☐ $1/3$

Question 3**1 pts**

iii.

☐ $3/5$

☐ $+\infty$

☐ 0

☐ $-\infty$

Considering the function $f(x) = \frac{x^2 - ax + a - 2}{x \sin(x)}$. Find the limit of $f(x)$ with $x < 0$ for all $a \in \mathbb{R}$.

Question 4**1 pts**

☐ $a > 3 \rightarrow +\infty$
 $a = 3 \rightarrow 0$
 $a < 3 \rightarrow -\infty$

☐ $a > 2 \rightarrow -\infty$
 $a \leq 2 \rightarrow +\infty$

☐ $a > 3 \rightarrow -\infty$
 $a = 3 \rightarrow 1$
 $a < 3 \rightarrow +\infty$

☐ $a \geq 2 \rightarrow +\infty$
 $a < 2 \rightarrow -\infty$

Suppose the function

$$f(x) = \begin{cases} e^{x-1} + a \cos(\pi x), & x \leq 1 \\ ax^2 - 3x + 2b, & 1 < x \leq 2 \\ \ln(x-1) + \sin(\pi x) + b - 1, & x > 2 \end{cases}$$

Find a, b such that f is continuous.

Question 5**1 pts**

- ☐ $a = 2, b = 1$
- ☐ $a = 1 = -b$
- ☐ $a = 1 = b$
- ☐ $a = 1/2, b = 1/3$

For all real values of γ , calculate

i) $\lim_{x \rightarrow \infty} (\sqrt{4x^2 + 1} + \gamma x - 1)$ ii) $\lim_{x \rightarrow \infty} \frac{\gamma x^3 + x^2 + 1}{(\gamma + 2)x^2 + x + 1}$

Question 6**1 pts**

i.

☐ $\gamma \geq 0 \rightarrow 1$
 $\gamma < 0 \rightarrow 0$

☐ $\gamma < -2 \rightarrow -\infty$
 $\gamma = -2 \rightarrow -1$
 $\gamma > -2 \rightarrow +\infty$

☐ $\gamma > 0 \rightarrow +\infty$
 $\gamma = 0 \rightarrow 2$
 $\gamma < 0 \rightarrow -\infty$

☐ $\gamma > 2 \rightarrow -2$
 $\gamma \leq 2 \rightarrow -\infty$

Question 7**1 pts**

ii.

☐ $\gamma \in (-\infty, -4) \cup (4, +\infty) \rightarrow 4/3$
 $\gamma \in [-4, 4] \rightarrow 3/4$

☐ $\gamma \in \mathbb{R} \setminus \{2/3\} \rightarrow +\infty$
 $\gamma = 2/3 \rightarrow 1$

☐ $\gamma > 0 \rightarrow +\infty$
 $\gamma = 0 \rightarrow 1$
 $\gamma < 0 \rightarrow -\infty$

☐ $\gamma \in (-\infty, -2) \cup (0, +\infty) \rightarrow +\infty$
 $\gamma = 0 \rightarrow 1/2$
 $\gamma \in [-2, 0) \rightarrow -\infty$

Given the function $f(x) = \frac{2x^2 - x + 3}{x^2 - 1}$.

i) Find the limits, $\lim_{x \rightarrow 1^-} f(x)$ and $\lim_{x \rightarrow 1^+} f(x)$.

ii) True or false? The limit of f at 1 does not exist.

iii) Find $\lim_{x \rightarrow 1} \frac{f(x)}{\sqrt{x} - 1}$.

Question 8**1 pts**

i.

☐ $\lim_{x \rightarrow 1^\pm} f(x) \rightarrow \mp\infty$

☐ $\lim_{x \rightarrow 1^+} f(x) \rightarrow 3/2$
 $\lim_{x \rightarrow 1^-} f(x) \rightarrow -3/2$

☐ $\lim_{x \rightarrow 1^\pm} f(x) \rightarrow 5/2$

☐ $\lim_{x \rightarrow 1^\pm} f(x) \rightarrow \pm\infty$

Question 9**1 pts**

ii.

☐ True

☐ False

Question 10**1 pts**

iii.

☐ 1

☐ $\sqrt{2}$

☐ \nexists

☐ $+\infty$

If the polynomial $P(x) = (a^2 - b^2)x^2 + (a + b)x + a^6 - b^6$ has more than two x -intercepts, then answer the following questions:

i) Why is the limit $\lim_{x \rightarrow -\infty} f(x)$ with $f(x) = \sqrt{(a + b)x^2 + x + ab}$ meaningless?

ii) Is this true?

$$\lim_{x \rightarrow \sqrt{\pi}^-} [P(x) + P(2x) + \cdots + P(2020x)] = \lim_{x \rightarrow \sqrt{\pi}^+} [P(x) + P(x^2) + \cdots + P(x^{2020})]$$

iii) Find the limit $\lim_{x \rightarrow \infty} \left(\frac{a - b}{a} - \frac{3}{2} \right)^{x^2 + e^x}$

Question 11

1 pts

i. Because the domain of the function is

☐ $D_f = [-10, a)$

☐ $D_f = [0, +\infty)$

☐ $D_f = (-a^2, 0]$

☐ $D_f = [a^2, +\infty)$

Question 12**1 pts**

ii.

☐ True

☐ False

Question 13**1 pts**

iii.

☐ $1/2$

☐ $-\infty$

☐ 2

☐ 0

Quiz saved at 7:43am

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