Quiz 2

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

Started: Sep 7 at 11:26am

Quiz Instructions

Choose the best solution choice for each multiple-choice problem. The last two problems require you to submit written work. The problems vary in value from 1 to 2 points.

Question 1

2 pts

Evaluate the limit analytically: $\lim_{x\to 4} \dfrac{x-4}{x-2\sqrt{x}}$

$0/0 \Rightarrow$ MORE WORK!

$\dfrac{x-4}{x-2\sqrt{x}} \cdot \dfrac{x+2\sqrt{x}}{x+2\sqrt{x}} = \lim_{x\to 4} \dfrac{(x-4)(x+2\sqrt{x})}{x^2-4x}$

FACTORS $x(x-4)$

$= \lim_{x\to 4} \dfrac{x+2\sqrt{x}}{x}$

$= \dfrac{8}{4} = 2$

- ○ The limit does not exist.
- ○ 0
- ○ 0/0
- ✗ 2

Question 2

2 pts

Evaluate the limit analytically: $\lim_{x\to -3} \dfrac{x^2+x-6}{x^3-9x}$

$0/0 \Rightarrow$ MORE WORK!

$= \lim_{x\to -3} \dfrac{(x+3)(x-2)}{x(x+3)(x-3)}$

$= \lim_{x\to -3} \dfrac{x-2}{x(x-3)}$

$= \dfrac{-5}{(-3)(-6)} = \dfrac{-5}{18}$

- ✗ −5/18
- ○ The limit does not exist.
- ○ 5/3
- ○ 0

Question 3

1 pts

Evaluate the limit analytically: $\lim_{x\to 5^+} f(x)$, where $f(x) = \begin{cases} 6x^2 + \sin(\pi x), & x < -3 \\ 3x^5 - 27x, & -3 \le x < 5 \\ 15x - 9, & x > 5 \end{cases}$.

- ○ 9240
- ⊗ 66
- ○ 0
- ○ The limit does not exist.

$\lim_{x\to 5^+} f(x) = \lim_{x\to 5^+} (15x-9)$

$= 15(5)-9$

$= 75-9 = 66$

Question 4

1 pts

Evaluate the limit analytically: $\lim_{x\to 4^-} \sqrt{4-x}$

- ⊗ 0
- ○ $\sqrt{8}$
- ○ The answer is not a real number.
- ○ The limit does not exist.

$\lim_{x\to 4^-} \sqrt{4-x} = \sqrt{4-4} = 0$

However, note that

$\lim_{x\to 4^+} \sqrt{4-x}$ DNE.

Question 5

2 pts

On paper, evaluate the limit analytically. Show all work. For the appropriate amount of work, look at the lecture 5 notes. Please submit as a pdf, jpg, or png file.

$\lim_{x\to -3^+} \dfrac{2-\sqrt{x^2-5}}{x+3}$

See attached.

Upload Choose a File

Question 6

2 pts

On paper, evaluate the limit analytically. Show all work. Use $+\infty$, $-\infty$, or DNE (does not exist) if appropriate. For the appropriate amount of work, look at the lecture 8 notes. Please submit as a pdf, jpg, or png file.

$$\lim_{x \to 2} \frac{3x^2 - 5x - 2}{(x-2)^2}$$

SEE ATTACHED.

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Question 5

$0/0 \Rightarrow$ More work!

$$\lim_{x \to -3^+} \frac{2 - \sqrt{x^2 - 5}}{x + 3}$$

$$= \lim_{x \to -3^+} \frac{2 - \sqrt{x^2-5}}{x+3} \cdot \frac{2 + \sqrt{x^2-5}}{2 + \sqrt{x^2-5}}$$

$$= \lim_{x \to -3^+} \frac{4 - (x^2 - 5)}{(x+3)\left(2 + \sqrt{x^2-5}\right)}$$

$$= \lim_{x \to -3^+} \frac{9 - x^2}{(x+3)\left(2 + \sqrt{x^2-5}\right)}$$

$$= \lim_{x \to -3^+} \frac{(3-x)\cancel{(3+x)}}{\cancel{(x+3)}\left(2 + \sqrt{x^2-5}\right)}$$

$$= \frac{6}{2 + \sqrt{4}} = \frac{6}{4} = \boxed{\frac{3}{2}}$$

Question 6

$$\lim_{x\to 2} \frac{3x^2-5x-2}{(x-2)^2}$$

$0/0 \Rightarrow$ More work

$$= \lim_{x\to 2} \frac{(x-2)(3x+1)}{(x-2)(x-2)}$$

$7/0 \Rightarrow$ Some kind of INF limit.

Because we got a $7/0$ form, we know there is growth without bound (some kind of INF. limit.).

We look to both sides of $x=2$.

Just to the left of $x=2$, $\frac{3x+1}{x-2} = \frac{\text{positive}}{\text{negative}} = \text{neg.}$

$$\lim_{x\to 2^-} \frac{3x+1}{x-2} = -\infty.$$

Just to the right of $x=2$, $\frac{3x+1}{x-2} = \frac{\text{positive}}{\text{positive}} = \text{pos.}$

$$\lim_{x\to 2^+} \frac{3x+1}{x-2} = +\infty.$$

Conclusion: $\lim_{x\to 2} \frac{3x^2-5x-2}{(x-2)^2}$ DNE.