Quiz 4

Graded

Student

Colin Cano

Total Points

8 / 10 pts

Question 1

1 **3** / 3 pts

✔ **– 0 pts** Correct: Student provides sufficient evidence that the IVT guarantees a solution by evaluating the equation at each end of the interval and then comparing with < and > or setting everything equal to zero and showing the equation goes from negative to positive.

Question 2

2a **2** / 2 pts

✔ **– 0 pts** Correct: $\frac{1}{2}$ or $\frac{2}{4}$

Question 3

2b **1** / 2 pts

✔ **– 1 pt** Student correctly gets to $\frac{\sqrt{9x^4}}{2x^3}$ but doesn't find the limit correctly

You need to divide by the same power of x both the numerator and denominator

Question 4

3 **2** / 3 pts

✔ **– 1 pt** Student correctly applies the limit definition but makes a mistake solving for the slope.

Where is the rest of the process?

MATH:1850 Quiz 3 Fall 2024
TA:

Name: Colin Camp **Student ID:** _____

1. Use the Intermediate Value Theorem to show there is a solution to the given equation in the specified interval: $2^x = 3 - 2x$, $(0, 1)$

$2^x - 3 + 2x, x = 0$

$2^0 - 3 + 0 = -2 < 0$

$2^x - 3 + 2x, x = 1$

$2^1 - 3 + 2(1) = 1 > 0$

IVT shows that it crosses x axis somewhere between $(0,1)$ since $-2 < 0$ and $1 > 0$

2. Find the following limits if they exist.

(a) $\lim_{x \to \infty} \dfrac{2x^2 + 7x - 6}{4x^2 + 2x + 1}$ $= \dfrac{\frac{2x^2}{x^2} + \frac{7x}{x^2} - \frac{6}{x^2}}{\frac{4x^2}{x^2} + \frac{2x}{x^2} + \frac{1}{x^2}} = \dfrac{2}{4} = \dfrac{1}{2}$

(b) $\lim_{x \to \infty} \dfrac{\sqrt{9x^4 - 5x^3}}{2x^3 + x - 2}$ $= \dfrac{\sqrt{\frac{9x^4}{x^4} - \frac{5x^3}{x^4}}}{\frac{2x^3}{x^3} + \frac{x}{x^3} - \frac{2}{x^3}} = \dfrac{\sqrt{9}}{2} = \dfrac{3}{2}$

3. Let $f(x) = 3x^2$. Find the slope of the line tangent to $f(x)$ at $x = 1$. You must use the fact that the slope of the line tangent to $f(x)$ at $x = a$ is given by $\lim_{h \to 0} \dfrac{f(h+a) - f(a)}{h}$.

$\lim_{h \to 0} \dfrac{f(h+a) - f(a)}{h} = \lim_{h \to 0} \dfrac{f(h+1) - f(1)}{h} = \lim_{h \to 0} \dfrac{f(h+1) - 3}{h} =$

$\lim_{h \to 0} \dfrac{3(h+1)^2 - 3}{h} = \dfrac{6h}{h} = 6$

?

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