

MATH 2200 - DIFFERENTIAL CALCULUS, Fall, 2005

QUIZ 1 8/24/05

Name : SOLUTIONS

1. State the domain of the following function:

$$f(x) = \frac{x^2}{x^2 - 4}$$

We need to find the x values at which the expression in the denominator ($x^2 - 4$) vanishes and exclude them from the domain.

$$\begin{aligned}x^2 - 4 &= 0 \\x^2 &= 4 \\x &= \pm 2\end{aligned}$$

Then the domain can be expressed either as

$$(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$$

or

$$(\infty, \infty) \setminus -2, 2$$

2. Find the following the limit if it exists:

$$\lim_{x \rightarrow 2} \sqrt{x^2 - 3x + 2}$$

Note that the function $f(x) = \sqrt{x^2 - 3x + 2}$ is continuous at $x = 2$, so the limit of $f(x)$ at $x = 2$ is equal to the value of the function at $x = 2$. Then

$$\lim_{x \rightarrow 2} \sqrt{x^2 - 3x + 2} = \sqrt{4 - 6 + 2} = \sqrt{0} = 0$$