

Math 233 - Quiz 7

March 23, 2023

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (8 points) Find the limit or show that it does not exist.

(a) $\lim_{(x,y) \rightarrow (0,0)} \frac{5x^3y}{2x^6 + y^2}$ % More work.

Along $x=0$: $\lim_{y \rightarrow 0} \frac{0}{y^2} = \lim_{y \rightarrow 0} 0 = 0$

Along $y=x^3$: $\lim_{x \rightarrow 0} \frac{5x^6}{3x^4} = \frac{5}{3}$

LIMIT ONE

(b) $\lim_{(x,y) \rightarrow (3,3)} \frac{x^2 - y^2 + x - y}{2x - 2y}$ % More work.

$$\begin{aligned} &= \lim_{(x,y) \rightarrow (3,3)} \frac{(x+y)(x-y) + (x-y)}{2(x-y)} = \lim_{(x,y) \rightarrow (3,3)} \frac{x+y+1}{2} \\ &= \boxed{\frac{7}{2}} \end{aligned}$$

2. (2 points) Let $f(x, y, z) = x^2y^3 + 2xyz - 3yz$. Compute $f_x(-2, 1, 2)$.

$$f_x(x, y, z) = 2xy^3 + 2yz$$

$$f_x(-2, 1, 2) = 2(-2)(1)^3 + 2(1)(2) = \boxed{0}$$