Math 233 - Quiz 7

March 26, 2026

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) $\lim_{(x,y)\to(0,0)} \dfrac{5x^3y}{2x^6+y^2}$ $\overset{0/0}{}$

Try some paths...

$y=0$: $\lim_{x\to 0} \dfrac{0}{2x^6} = \lim_{x\to 0} 0 = 0$

$y=x^3$: $\lim_{x\to 0} \dfrac{5x^6}{3x^6} = \lim_{x\to 0} \dfrac{5}{3} = \dfrac{5}{3}$

• Two different limits $\Rightarrow$ Limit DNE.

(b) $\lim_{(x,y)\to(3,3)} \dfrac{x^2-y^2+x-y}{2x-2y}$ $\overset{0/0}{=}$ $\lim_{(x,y)\to(3,3)} \dfrac{(x-y)(x+y+1)}{2(x-y)} = \boxed{\dfrac{7}{2}}$

(c) $\lim_{(x,y,z)\to(1,2,3)} \dfrac{\sqrt{x}-3y+z^2}{x+2y+2z} = \dfrac{1-6+9}{1+4+6} = \boxed{\dfrac{4}{11}}$

2. (2 points) Give three differents paths through the point $(1,2)$.

Here are six:

$y=2$

$x=1$

$y=2x$

$y=x+1$

$y=x^2+1$

$y=-2\cos(\pi x)$