Name Solution Key .....

UNIVERSITY OF WYOMING | Math 2200—Spring 2020 | Department of Mathematics

Calculus I

Quiz 2—Friday, February 7

A function f is known to satisfy

$$\lim_{x\to 3} f(x) = 0.$$

For each of the following, evaluate the indicated limit (if it exists) in simplified form; or state that the limit does not exist; or indicate whether not enough information is given to properly answer.

(a) $\lim_{x\to 3} \frac{f(x)+2}{f(x)-1} =$ $\frac{0+2}{0-1} = -2.$ (Use the limit laws.)

(b) $\lim_{h\to 0} f(3+h) =$ $\lim_{x\to 3} f(x) = 0.$ (Substitute $x = h+3$. As $h\to 0$, $x\to 3$.)

(c) $\lim_{x\to 3} xf(x) =$ $3\cdot 0 = 0.$ (Use the limit laws.)

(d) $\lim_{x\to 3} \cos f(x) =$ $\cos 0 = 1.$

(e) $\lim_{x\to 3} \frac{1}{f(x)} =$ It is impossible to determine the limit from the information given. Eg. if $f(x) = x-3$ then the limit does not exist. If $f(x) = (x-3)^2$ then the limit is ∞. If $f(x) = -(x-3)^2$ then the limit is $-\infty$. If $f(x) = 0$ then $\frac{1}{f(x)}$ is not even defined.