Math 131 - Quiz 3

September 6, 2023

Name key

Score _____

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

1. (10 points) Evaluate each limit analytically. Show all work.

(a) $\lim_{x\to 2} \dfrac{x^3 - x^2 - 2x}{x^2 + 2x - 8}$ % More work

$$= \lim_{x\to 2} \frac{x(x-2)(x+1)}{(x-2)(x+4)} = \lim_{x\to 2} \frac{x(x+1)}{x+4} = \frac{6}{6} = \boxed{1}$$

% More work

(b) $\lim_{x\to 9} \dfrac{x-9}{3-\sqrt{x}} \cdot \dfrac{3+\sqrt{x}}{3+\sqrt{x}} = \lim_{x\to 9} \dfrac{(x-9)(3+\sqrt{x})}{9-x}$

$$= \lim_{x\to 9} \frac{(x-9)(3+\sqrt{x})}{(-1)(x-9)} = \frac{6}{-1} = \boxed{-6}$$

% More work

(c) $\lim_{w\to -2} \dfrac{(w+3)^2 - w^2 + 3}{w+2}$

$$= \lim_{w\to -2} \frac{w^2+6w+9-w^2+3}{w+2}$$

$$= \lim_{w\to -2} \frac{6w+12}{w+2} = \lim_{w\to -2} \frac{6(w+2)}{w+2}$$

$$= \boxed{6}$$