

# Math 131 - Quiz 2

January 30, 2020

Name key

Score \_\_\_\_\_

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

1. (3 points) Evaluate each limit analytically. DO NOT USE A CALCULATOR.

$$(a) \lim_{x \rightarrow 1} \frac{x^5 - 7x}{2x^2 - x} = \frac{(1)^5 - 7(1)}{2(1)^2 - 1} = \frac{1 - 7}{2 - 1} = \boxed{-6}$$

$$(b) \lim_{x \rightarrow 4} (5\sqrt{x} - \sin(\pi x) + x^2 - 1)$$
$$= 5\sqrt{4} - \sin 4\pi + (4)^2 - 1$$
$$= 10 - 0 + 16 - 1 = \boxed{25}$$

2. (3.5 points) Explain why the limit laws cannot be used to evaluate the following limit. Then use a different technique to find or estimate the limit.

$$\lim_{x \rightarrow 3} \frac{2x^2 - 18}{x - 3}$$

SINCE THE LIMIT  
OF THE DENOM IS  
ZERO, THE LIMIT LAWS  
DO NOT APPLY.

DIRECT SUBS GIVES  $\frac{0}{0}$ .

$$\lim_{x \rightarrow 3} \frac{2(x^2 - 9)}{x - 3} = \lim_{x \rightarrow 3} \frac{2(x+3)(x-3)}{x-3} = 2(6)$$

3. (3.5 points) Explain why the limit laws cannot be used to evaluate the following limit. Then use a different technique to find the limit analytically.

$$\lim_{x \rightarrow 0} \frac{(x+2)^2 + 3(x+2) - 10}{x}$$

THE LIMIT OF THE DENOM  
IS ZERO -- CAN'T USE  
LIMIT LAWS!

DIRECT SUBS GIVES  $\frac{0}{0}$ .

$$\lim_{x \rightarrow 0} \frac{x^2 + 4x + 4 + 3x + 6 - 10}{x}$$

$$\lim_{x \rightarrow 0} \frac{x^2 + 7x}{x} = \lim_{x \rightarrow 0} x + 7 = \boxed{7}$$