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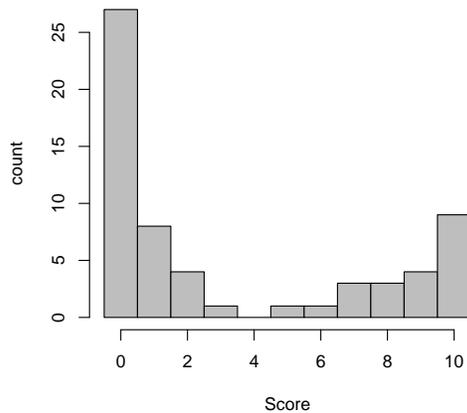
Name: \_\_\_\_\_

**Show your work!**

You may not give or receive any assistance during a test, including but not limited to using notes, phones, calculators, computers, or another student's solutions. (You may ask me questions.)

- /10 1. Solve the equation and describe all solutions that lie in the interval  $[0, 2\pi)$ :

$$2 \sin^2(\theta) = 5 \sin(\theta) + 3.$$



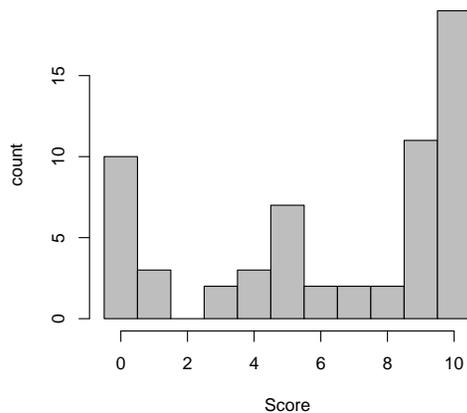
- /10 2. Use the properties of logarithms to rewrite the following expressions:

- Write as a single logarithm:

$$\log_2(x^3 - 4) + 2 \log_2(x + 2) - 4 \log_2(3x + 2)$$

- Write so that the result does not contain any powers, products, or quotients:

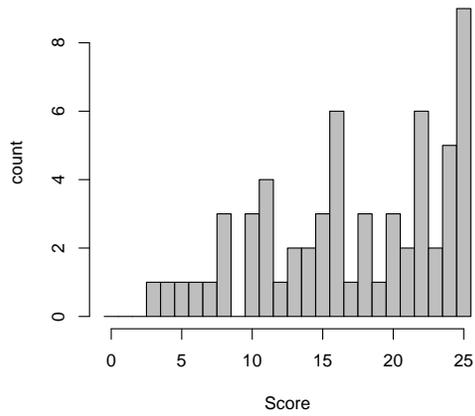
$$\log_3 \left( \frac{xy}{z^2 \sqrt[3]{w}} \right)$$



/25 3. Consider the rational function

$$f(x) = \frac{x^2 + 4x + 3}{x^2 - 1}.$$

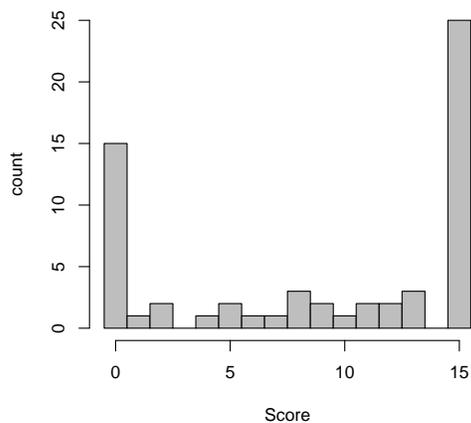
- Express the domain of  $f$  in interval notation.
- Find the  $x$  and  $y$  intercepts of  $f$ .
- Find all vertical and horizontal asymptotes.
- Identify any holes.
- Sketch a detailed graph of  $f$ .



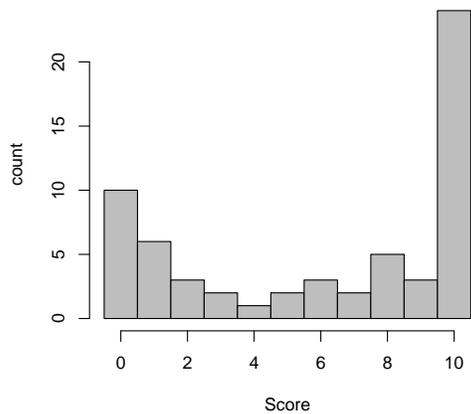
/15 4. Let

$$g(x) = \begin{cases} \frac{2x^2 - x - 15}{x - 3} & \text{if } x \neq 3 \\ kx - 1 & \text{if } x = 3 \end{cases}.$$

Determine the value of  $k$  that will make the function  $g$  continuous, or explain why no value of  $k$  will work.

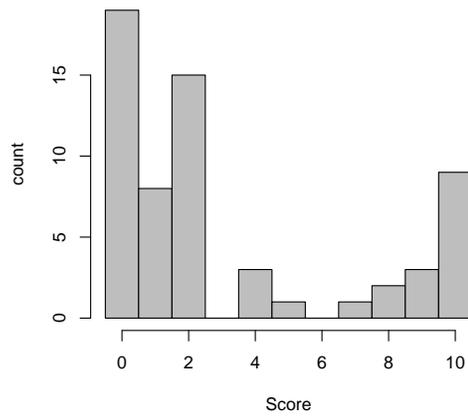


/10 5. Use the Intermediate Value Theorem to show that the equation  $2^{-x} = x$  has a solution.

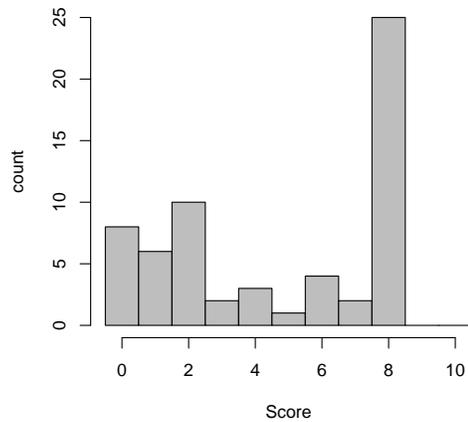


6. Compute the following limits. If you use the Squeeze Theorem, then indicate the two functions that you are using to squeeze.

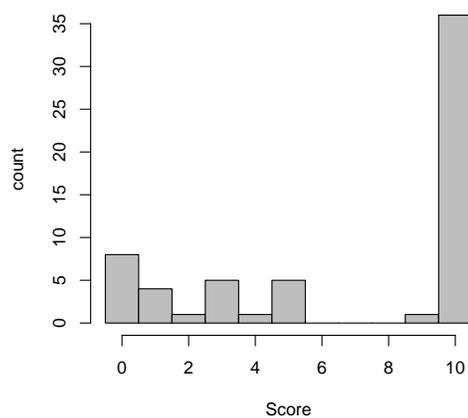
/10 (a) For  $f(x) = (2x + 1)^{-1}$ , compute  $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} =$



/10 (b)  $\lim_{x \rightarrow 0} 4x \cos(3/x) =$



/10 (c)  $\lim_{x \rightarrow 9} \frac{x-9}{\sqrt{x}-3} =$



# Total

