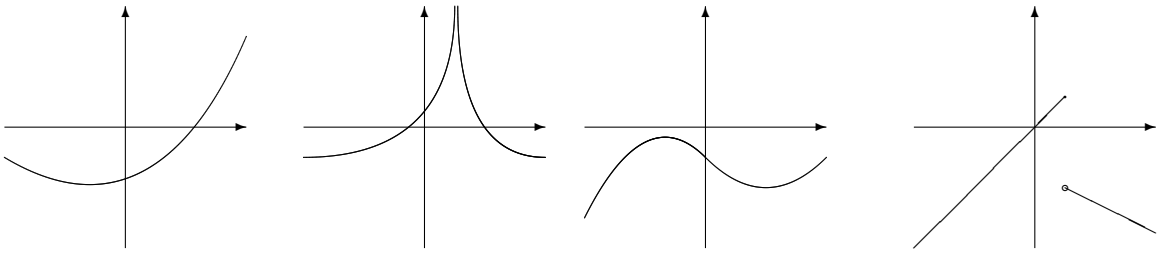
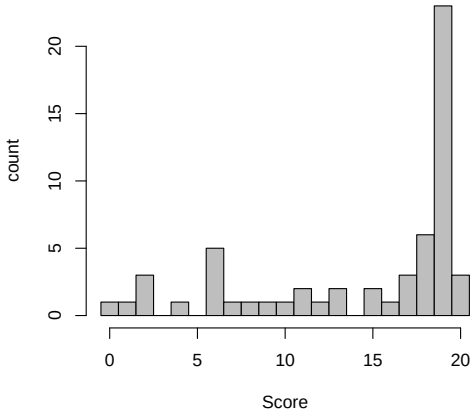
score	possible	page
	20	1
	30	2
	20	3
	30	4
	100	

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.)

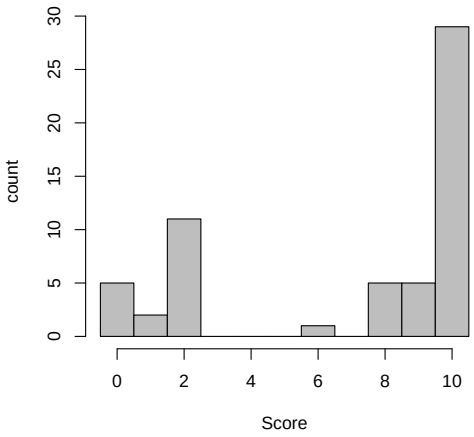
/20 1. The graph of a function f is given in each part below. On the same axes, sketch the graph of f'.



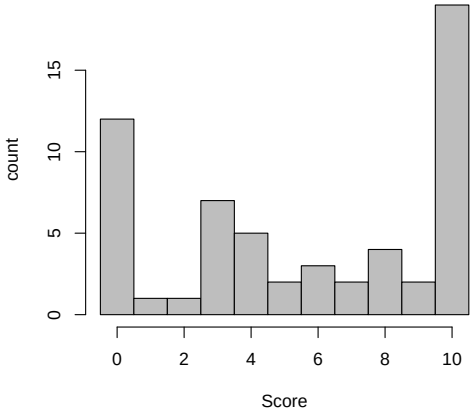


2. Let $f(x) = (2x+1)^{-1}$.

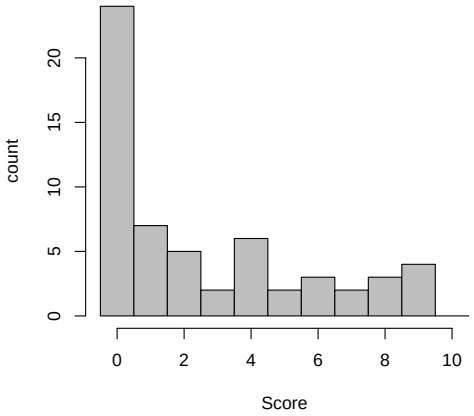
/10 (a) Using the definition of the derivative as a limit, compute $f'(x)$.



/10 (b) Find the equation for the tangent line at $x = 2$.



/10 (c) Graph $f(x)$ and the tangent line.



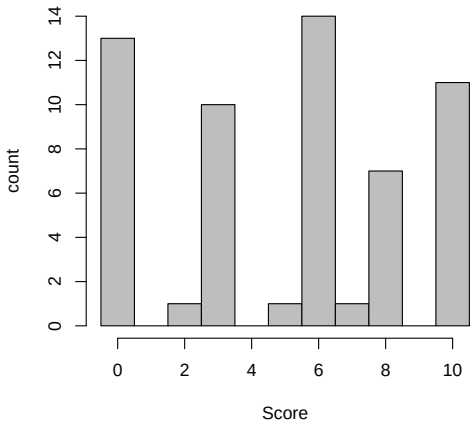
/10 3. Compute the following limits and simplify the results.

(a) $\lim_{x\to\infty} \pi/x =$

(b) $\lim_{x\to\infty} \cos(\pi/x) =$

(c) $\lim_{x\to\infty} \sin\left(\dfrac{\pi}{6\cos(\pi/x)}\right) =$

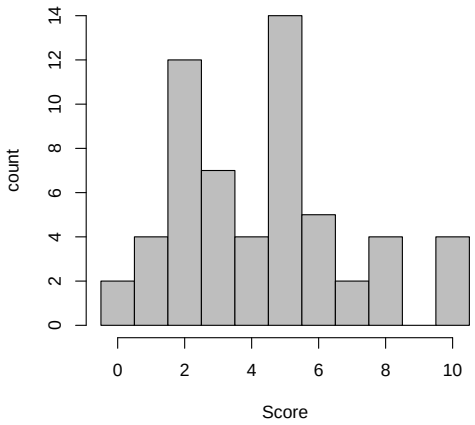
(d) $\lim_{x\to\infty} \log_2\left(\sin\left(\dfrac{\pi}{6\cos(\pi/x)}\right)\right) =$



/10 4. State

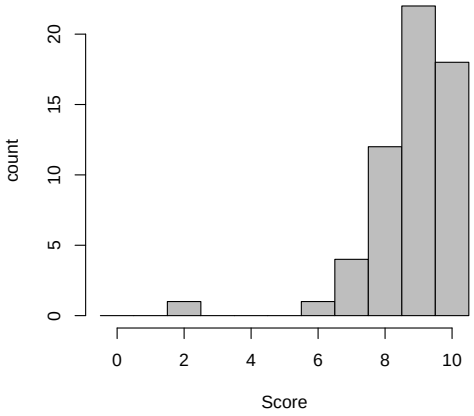
- the definition of "Continuous" and
- the definition of "Differentiable".

Give an example of a function that is one but not the other.

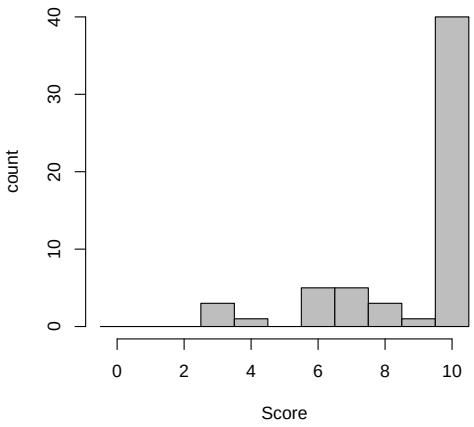


5. Compute the following derivatives:

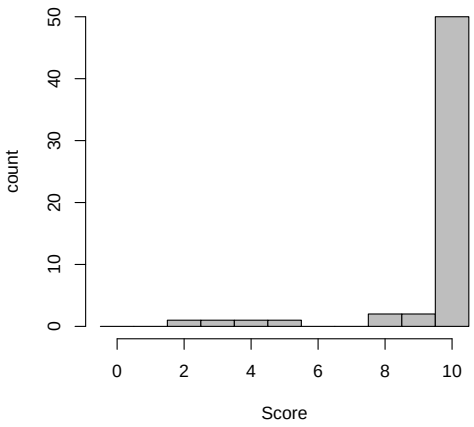
/10 (a) $f(x) = 2 + x - x^2 + \dfrac{3}{x} - \sqrt{x} - 5x^7 + x^{3/4} + 3\sin(x) + \cot(x) - \sin(7)$
$\Rightarrow f'(x) =$



/10 (b) $D_x\left[\cos(x)(8\cos(x) + x^5 + 3x)\right] =$



/10 (c) $y = \dfrac{x^3 - 5x}{\sin(x) + x} \Rightarrow \dfrac{dy}{dx} =$



Total