childsmath $\int_M d\omega = \int_{\partial M} \omega$

Math 3A03
Poll Results

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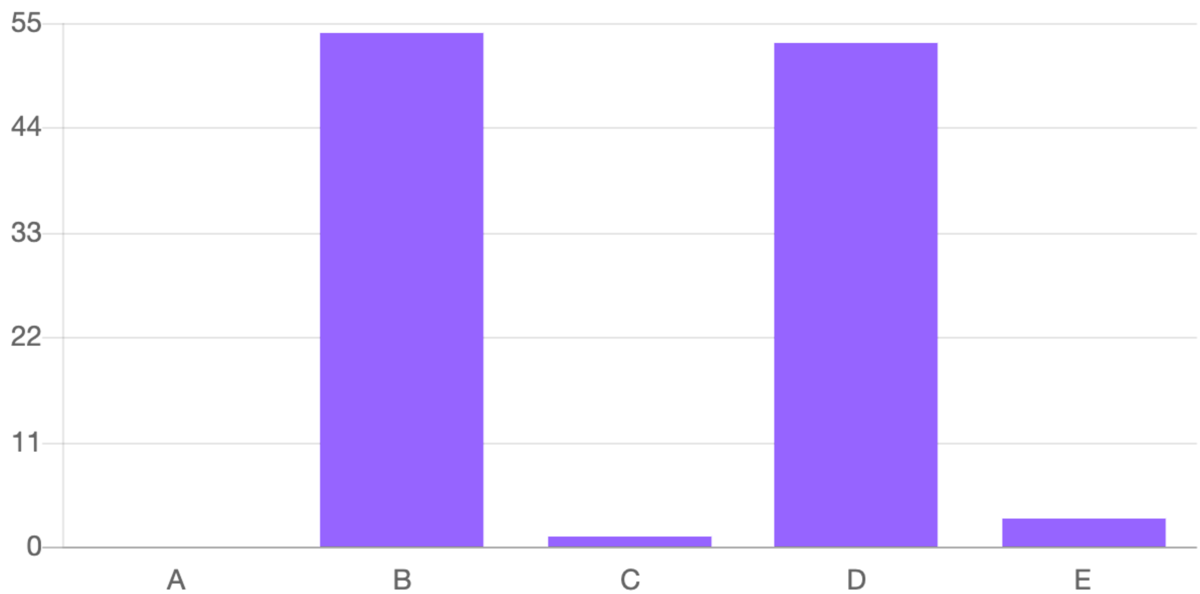
Assignment 1: The Derivative

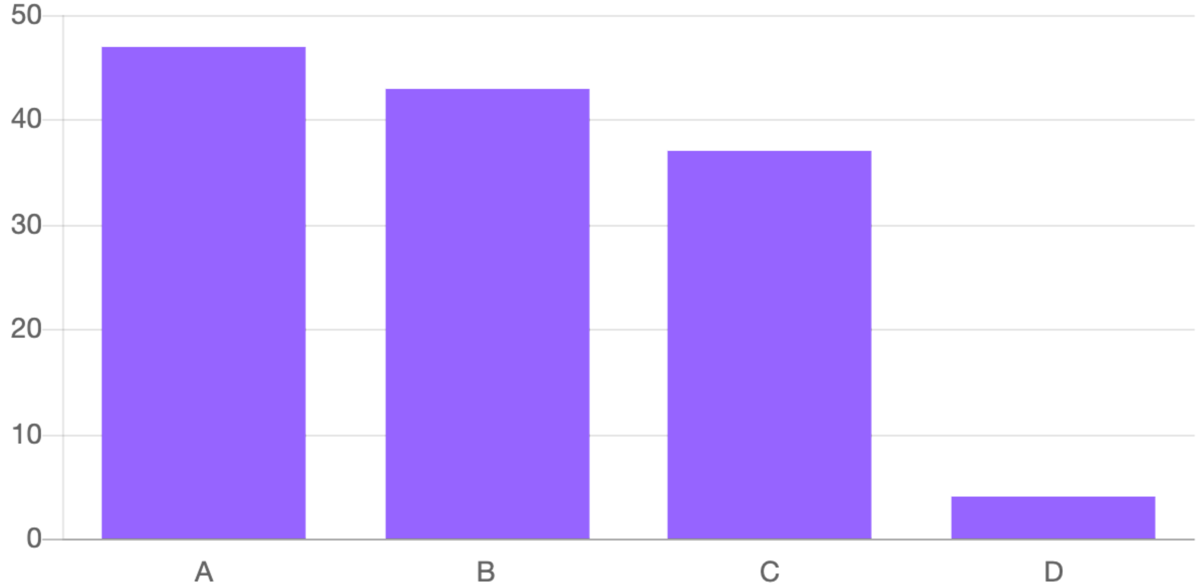
Question #1 A function $f : \mathbb{R} \to \mathbb{R}$ is even if $f(-x) = f(x)$ for all x, and odd if $f(-x) = -f(x)$ for all x. Suppose f is differentiable. Which of the following statements are true?

(A) If f is even then f' is even.
(B) If f is even then f' is odd.
(C) If f is odd then f' is odd.
(D) If f is odd then f' is even.
(E) I have not had sufficient time to think about this yet.



Question #2 In class, we stated Rolle's Theorem as follows: If f is continuous on $[a, b]$ and differentiable on (a, b), and $f(a) = f(b)$, then there exists $x \in (a, b)$ such that $f'(x) = 0$. Do we definitely need all three hypotheses of the theorem in order to be sure that the conclusion follows? Put another way, in which of the following cases is it possible to construct a function that satisfies the two conditions listed but for which it is not true that there exists $x \in (a, b)$ such that $f'(x) = 0$?

(A) f is continuous on $[a, b]$ and differentiable on (a, b);
(B) f is continuous on $[a, b]$ and $f(a) = f(b)$;
(C) f is differentiable on (a, b) and $f(a) = f(b)$.
(D) I have not had sufficient time to think about this yet.



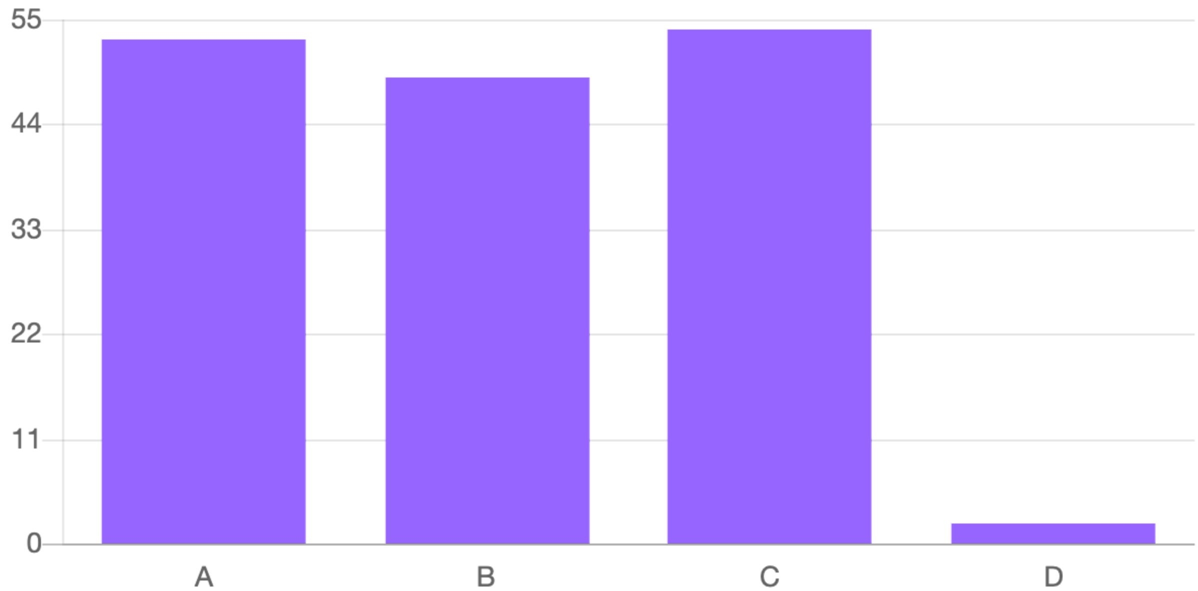
Question #3 Which of the following statements are true?

(A) If f is defined on an interval and $f'(x) = 0$ for all x in the interval, then f is constant on the interval.

(B) If f and g are defined on the same interval and $f'(x) = g'(x)$ for all x in the interval, then $\exists c \in \mathbb{R}$ such that $f = g + c$.

(C) If $f'(x) > 0$ for all x in an interval I, then f is increasing on I.

(D) I have not had sufficient time to think about this yet.



Question #4 Suppose $f : (a, b) \to \mathbb{R}$ is differentiable and that $f'(x) \neq 0$ for all $x \in (a, b)$. It follows that:

(A) f is increasing

(B) f is decreasing

(C) f is monotone

(D) f is not monotone

(E) f has exactly one extremum

(F) I have not had sufficient time to think about this yet.