childsmath

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

Math 3A03
Poll Results

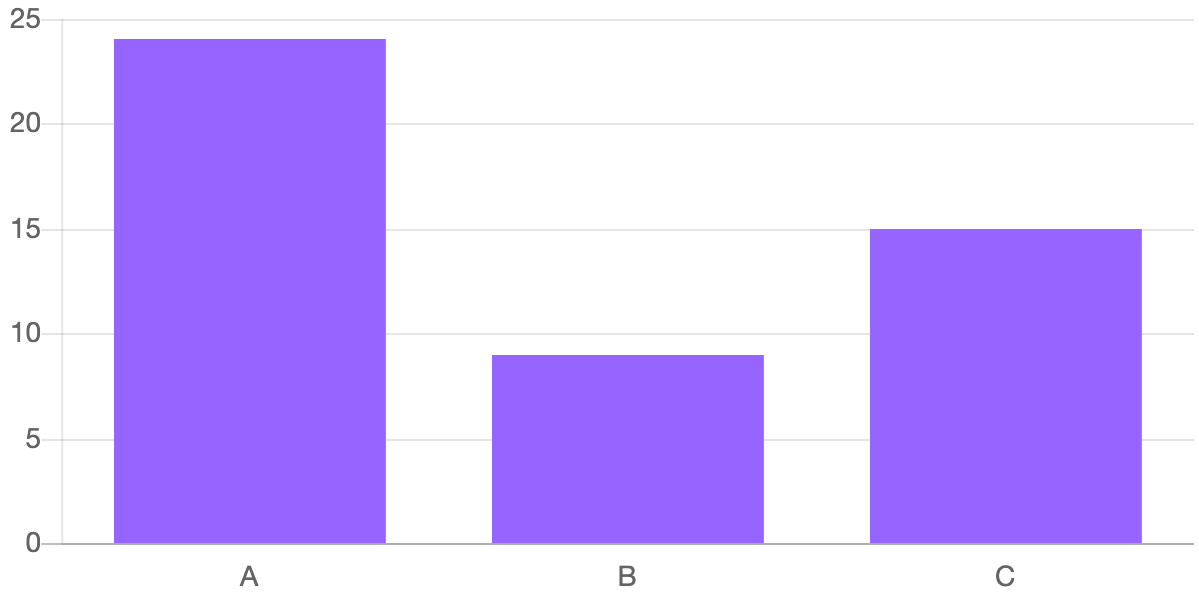
earn

Metric spaces: Set differences of balls

Question #1 Suppose $0 < r_1 < r_2$ and $B_{r_1}(x)$ and $B_{r_2}(x)$ are balls centered at x in the metric space $(\mathbb{R}, \textbf{standard})$.

Which of the following are true?

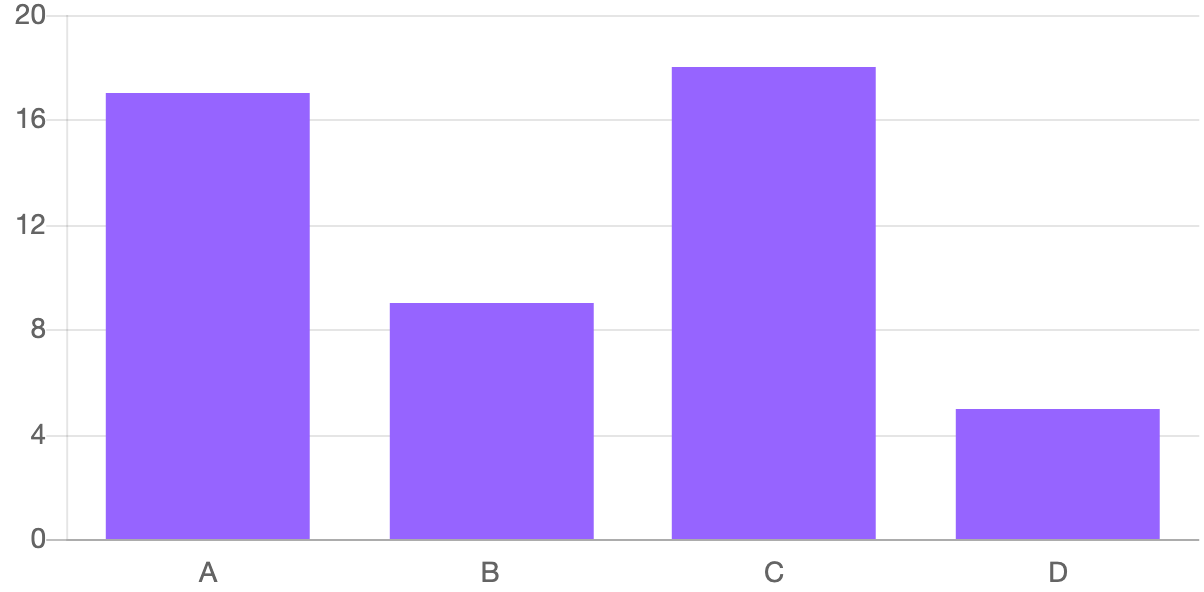
(A) $B_{r_2}(x) \setminus B_{r_1}(x)$ is open;
(B) $B_{r_2}(x) \setminus B_{r_1}(x)$ is closed;
(C) $B_{r_2}(x) \setminus B_{r_1}(x)$ is neither open nor closed.



Question #2 Now suppose $0 < r_1 < r_2$ and $B_{r_1}(x)$ and $B_{r_2}(x)$ are balls centered at x in the metric space $(\mathbb{R}^n, \textbf{Euclidean})$ for $n \geq 2$.

Which of the following are true?

(A) $B_{r_2}(x) \setminus B_{r_1}(x)$ is open;
(B) $B_{r_2}(x) \setminus B_{r_1}(x)$ is closed;
(C) $B_{r_2}(x) \setminus B_{r_1}(x)$ is neither open nor closed;
(D) It depends on the dimension n.



Question #3 Now suppose $0 < r_1 < r_2$ and $B_{r_1}(x)$ and $B_{r_2}(x)$ are balls centered at x in the metric space $(\mathbb{R}^n, \textbf{discrete})$.

Which of the following are true?

(A) $B_{r_2}(x) \setminus B_{r_1}(x)$ is open;
(B) $B_{r_2}(x) \setminus B_{r_1}(x)$ is closed;
(C) $B_{r_2}(x) \setminus B_{r_1}(x)$ is neither open nor closed;
(D) It depends on the dimension n;
(E) It depends on the specific values of r_1 and r_2.