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

Math 3A03
Poll Results

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Metric spaces: compactness

Question #1 Consider the real numbers $\mathbb{R}$ with a metric $d(x, y)$. For convenience abbreviate as follows:

- CB = closed and bounded
- S = sequentially compact (Bolzano-Weierstrass property)
- C = covering compact (Heine-Borel property)

Which of the following statements are true?

(A) If d is the standard metric on $\mathbb{R}$ then CB, S, and C are equivalent;
(B) If d is the discrete metric on $\mathbb{R}$ then SC and CC are equivalent, but CB is distinct;
(C) If d is the discrete metric on $\mathbb{R}$ then CB, S, and C are all distinct;
(D) there is no metric on $\mathbb{R}$ in which CB, S, and C are all distinct;
(E) the discrete metric is the only metric on $\mathbb{R}$ in which CB is distinct from S and C;
(F) there are many possible metrics on $\mathbb{R}$ in which CB is distinct from S and C.