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existence of the Lebesgue measure

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Theorem (Lebesgue). *Let \mathcal{B} be the <http://planetmath.org/BorelSigmaAlgebra> Borel σ -algebra on the real number line. Then, there is a unique measure μ on the measurable space $(\mathbb{R}, \mathcal{B})$ satisfying*

$$\mu((a, b)) = b - a$$

for all real numbers $a < b$.