
UNITED STATES OF AMERICA
IN
GOD WE
TRUST

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$$\frac{1}{3} = .01010101\cdots$$

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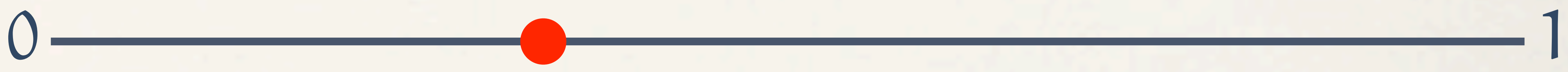

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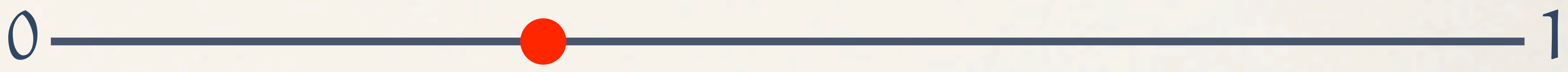

A continuous sample space: $\Omega = [0,1] := \{\, x : 0 \leq x \leq 1 \,\}$

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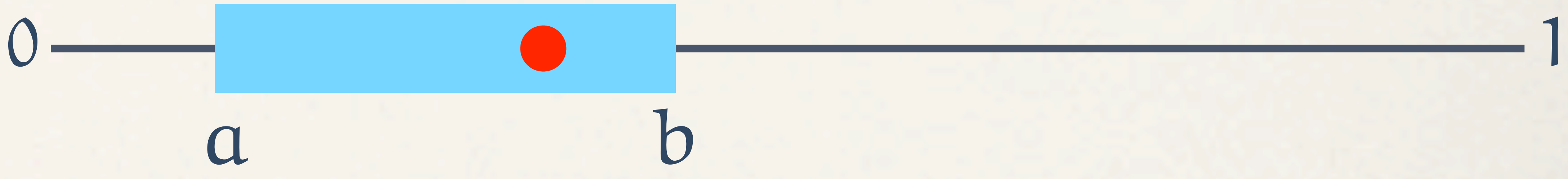

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The basic events are intervals: $A = [a,b] := \{\, x : a < x < b \,\}$

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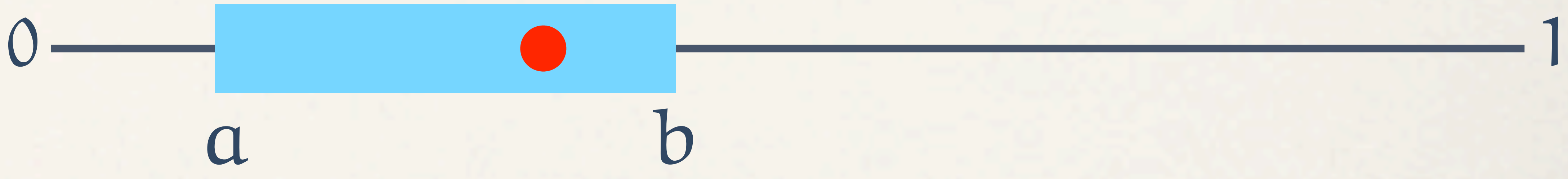

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Probabilities identified with lengths: $\mathbf{P}\big([a, b]\big) = b - a$

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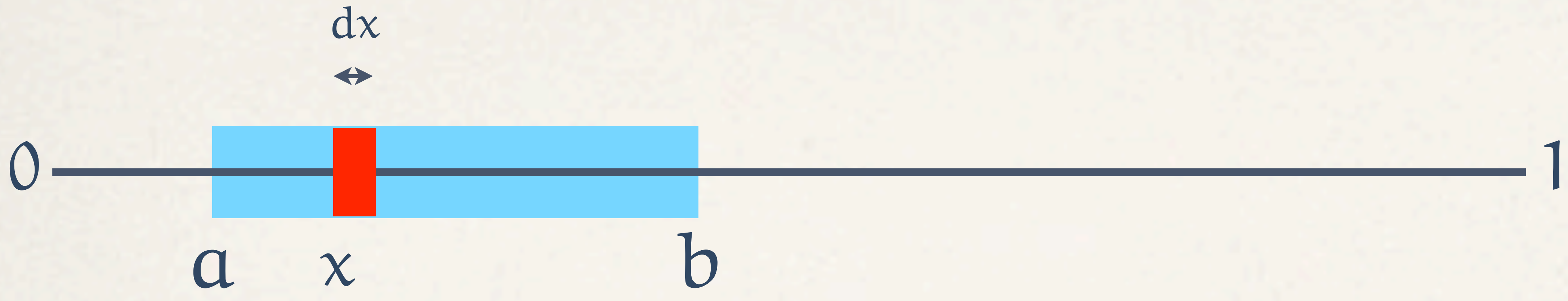

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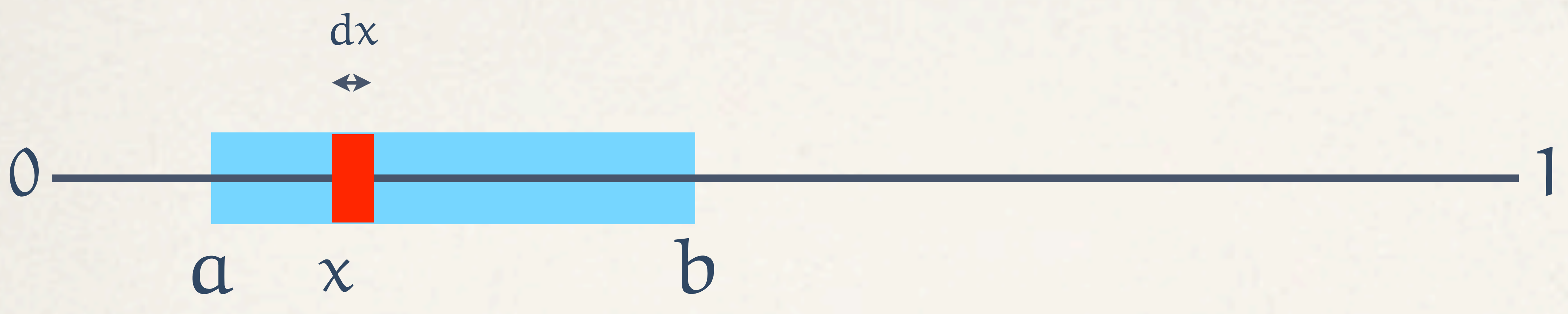
The probability of an infinitesimal interval $[x, x + dx]$:



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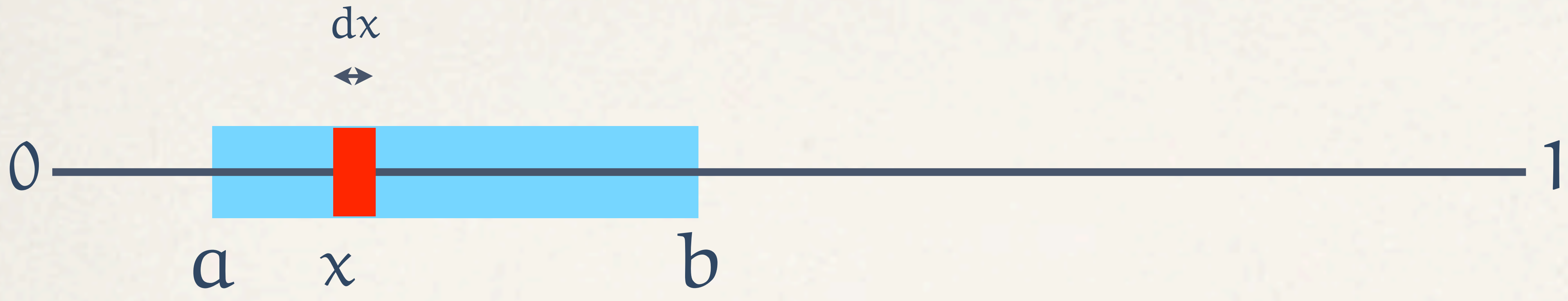

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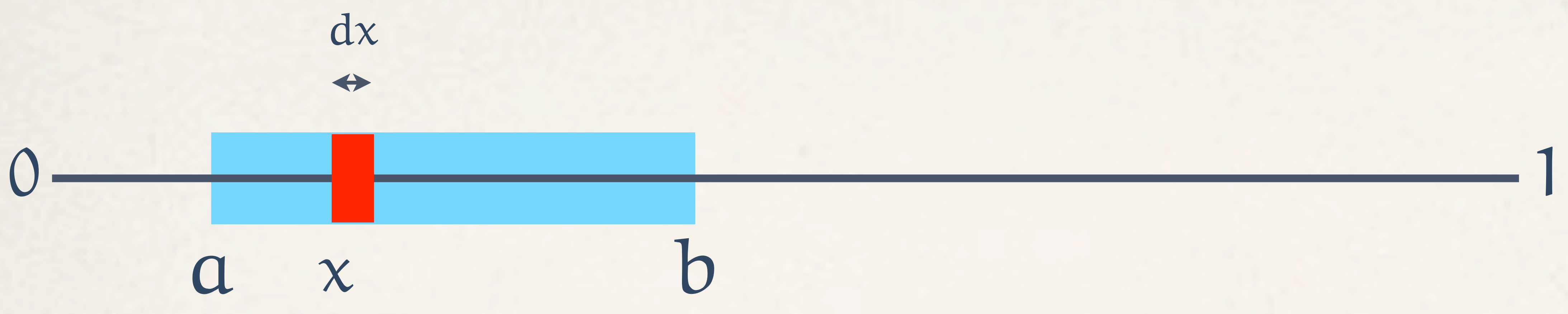

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uniform mass density per unit length at the point x

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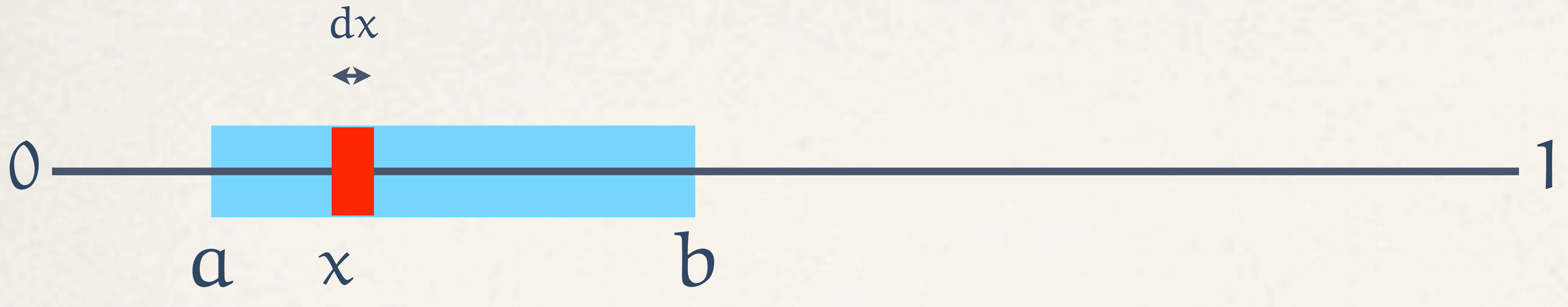

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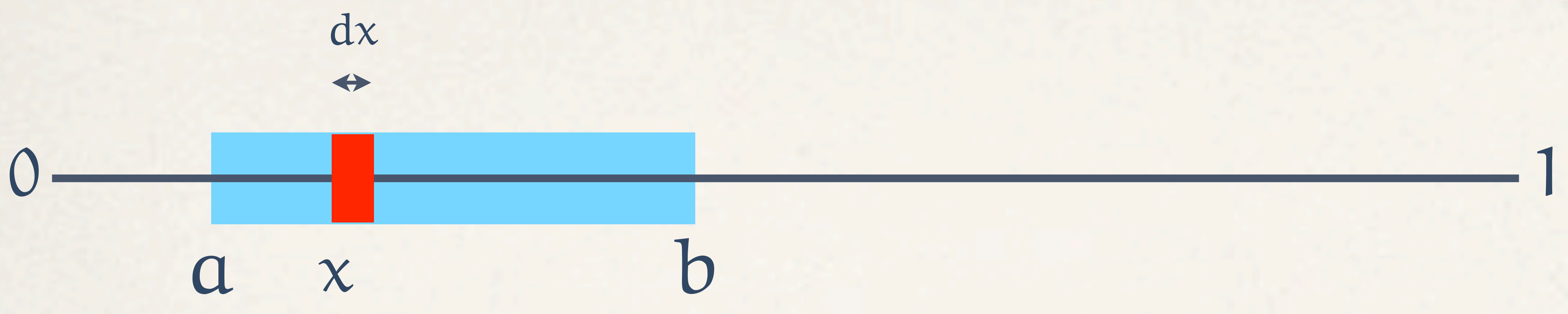

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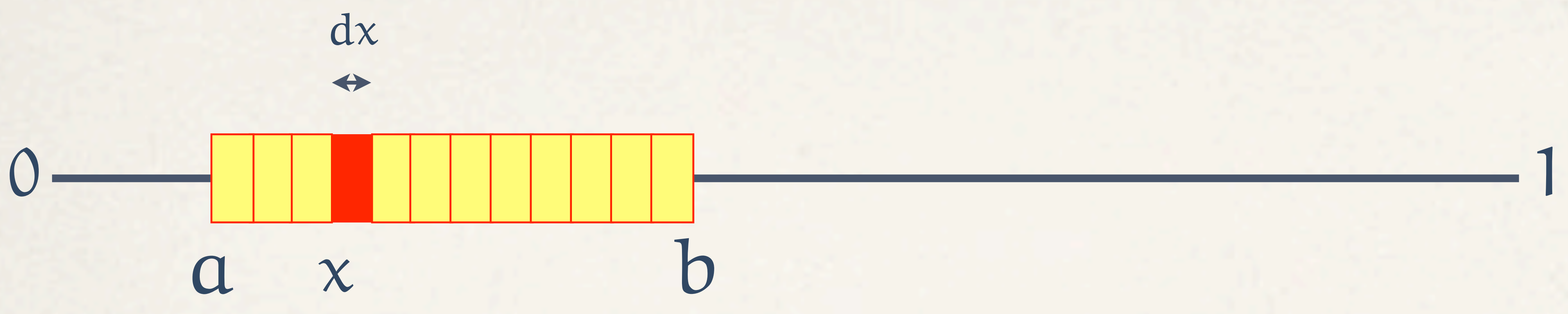

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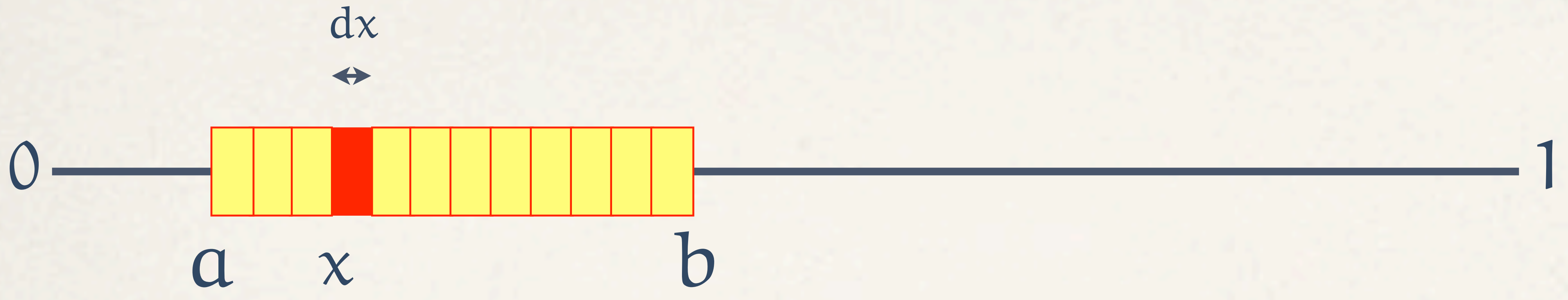

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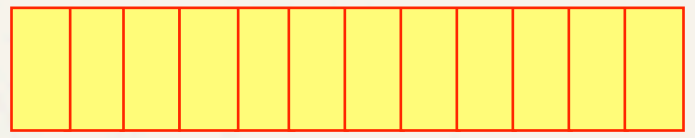
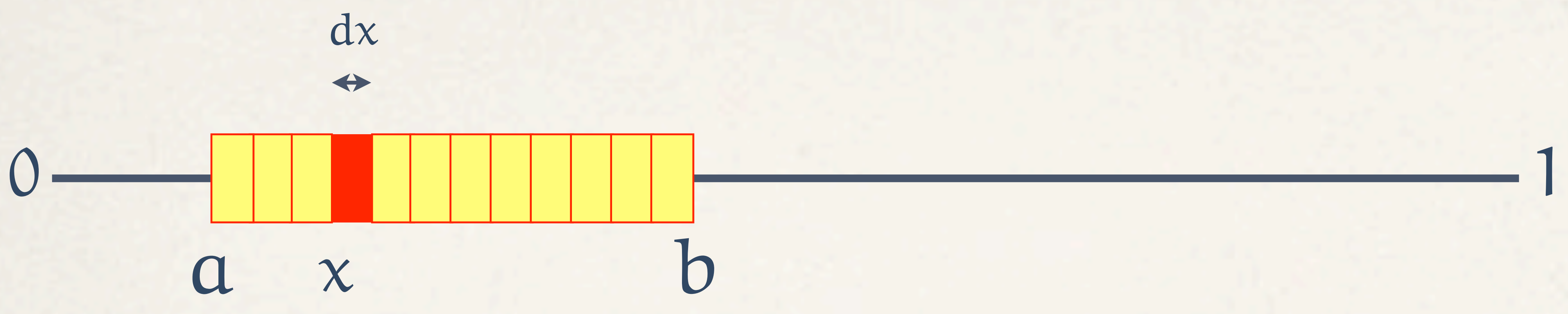


Additivity: $$\sum_x \mathbf{P}\big([x, x + dx]\big)$$



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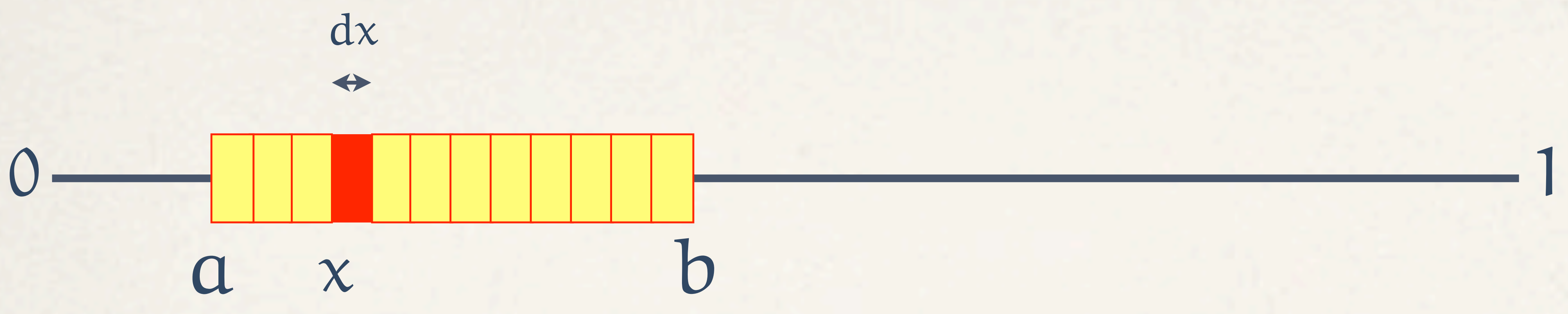

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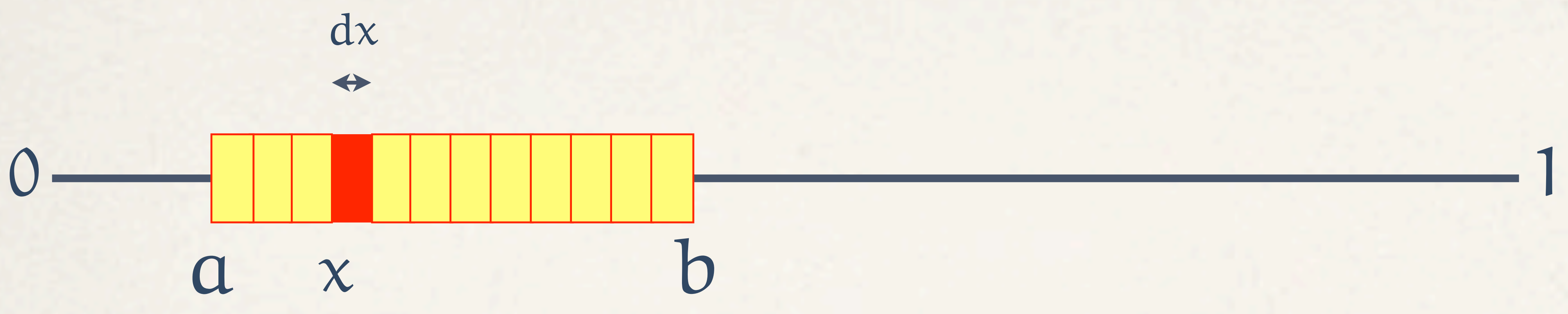

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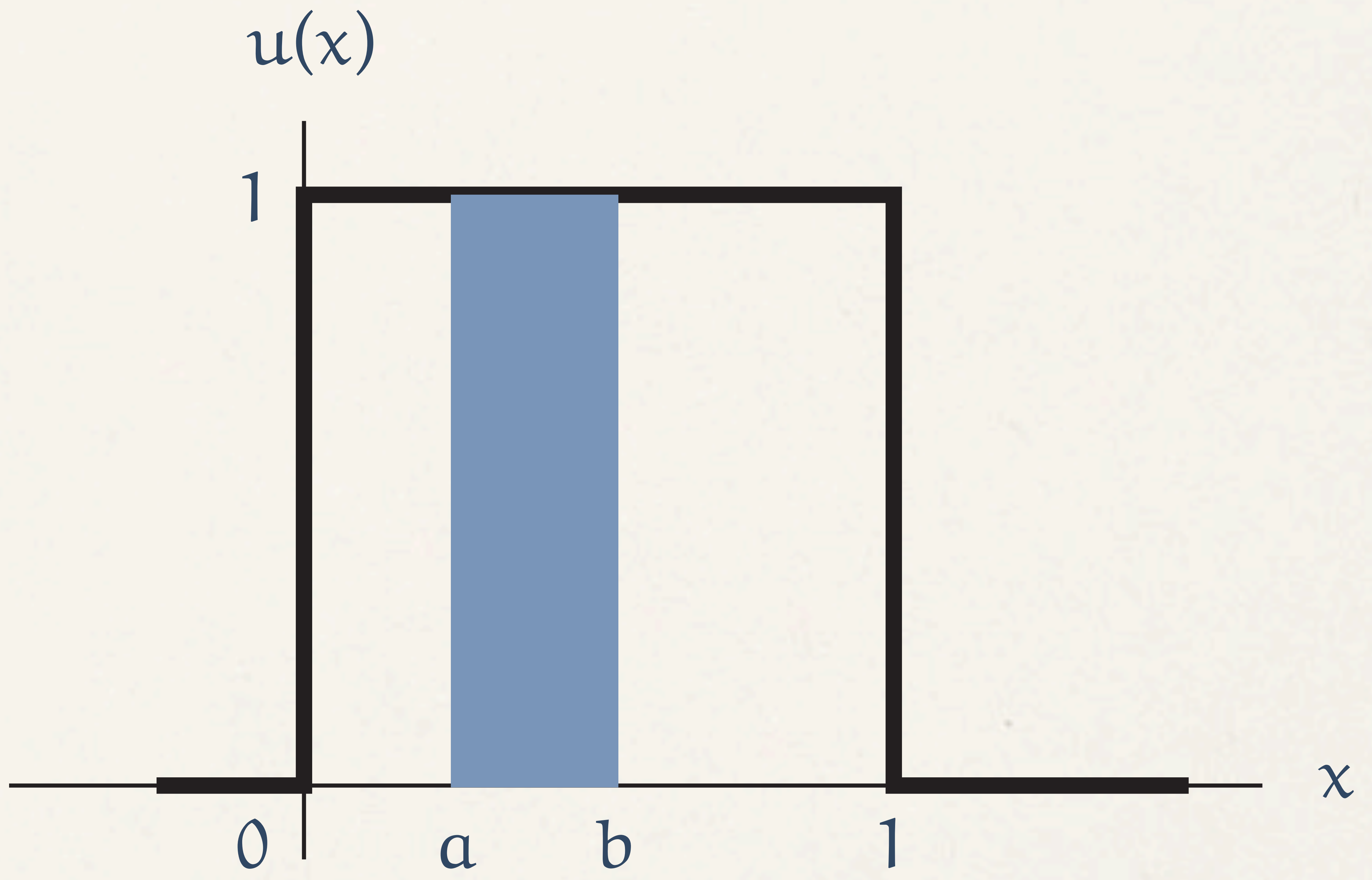
The uniform density in the unit interval



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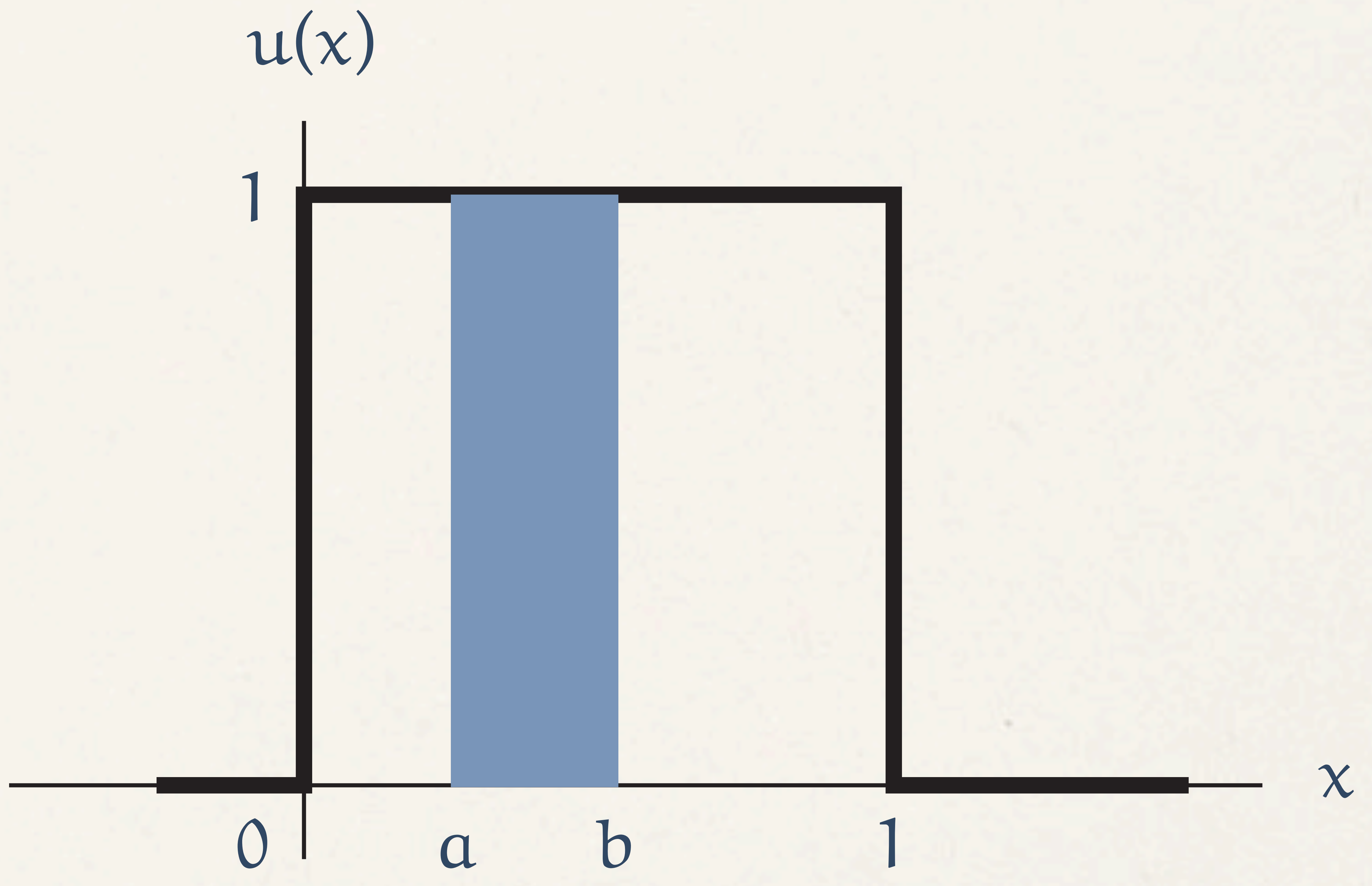

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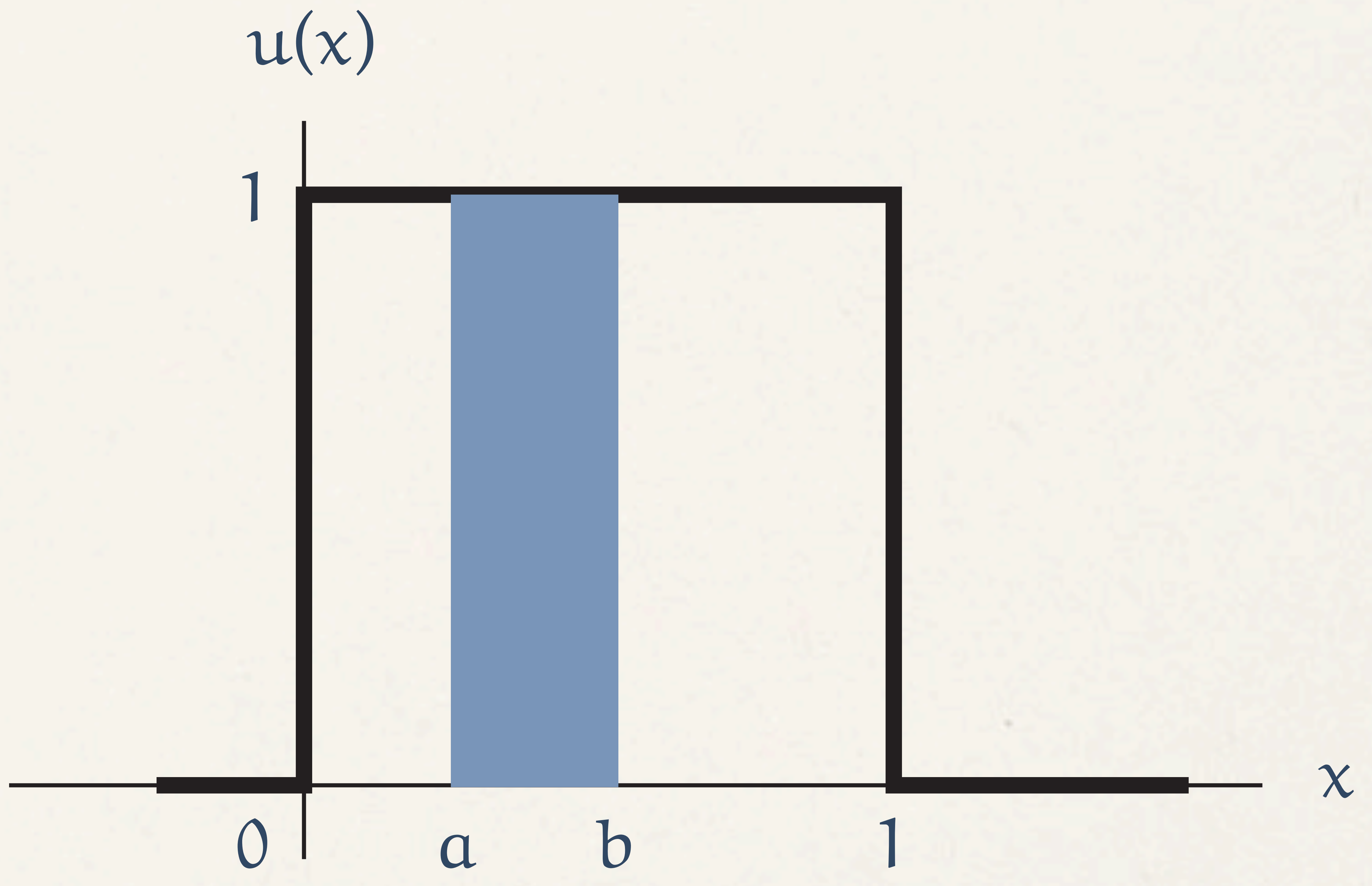

We identify probabilities with areas under a density curve