

Uniform Distribution

For X uniform on the stated closed interval [a,b], use density 1/(b-a) on the support and 0 outside it. Clip probability intervals to the support, divide overlap lengths for conditional intervals, include the boundary branches of the CDF, and give exact values where practical; otherwise round the final value to four decimals.

1. Let X be uniform on [-3, -1]. Find the 40th percentile q, defined by $P(X \leq q) = 0.4$.

Given: X is measured in units and is continuous with constant density on [-3, -1] and density 0 outside; endpoints have probability 0.

2. Let X be uniform on [-6, 5]. Find $\text{Var}(X)$. State the squared units.

Given: X is measured in units and is continuous with constant density on [-6, 5] and density 0 outside; endpoints have probability 0.

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3.

Let X be uniform on $[-6, 0]$. Find $P(-6 \leq X \leq 0 \mid -8 \leq X \leq -1)$.

Given: X is measured in units and is continuous with constant density on $[-6, 0]$ and density 0 outside; endpoints have probability 0.

4.

Let X be uniform on $[-4, 6]$. Find $P(X \geq 5)$.

Given: X is measured in units and is continuous with constant density on $[-4, 6]$ and density 0 outside; endpoints have probability 0.

Math Sheet

Name _____ Score _____ Teacher _____ Date _____

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5. Let X be uniform on $[-5, -2]$. Two model descriptions are proposed. Model A has constant PDF $1/3$ on $[-5, -2]$ and 0 outside. Model B assigns probability $d/3$ to every subinterval of length d inside $[-5, -2]$. Select which descriptions represent Uniform $(-5, -2)$, then state the support, full piecewise PDF, and full piecewise CDF.

Given: X is measured in units and is continuous with constant density on $[-5, -2]$ and density 0 outside; endpoints have probability 0.

6. Let X be uniform on $[5, 15]$. Find $P(3 \leq X \leq 17)$.

Given: X is measured in units and is continuous with constant density on $[5, 15]$ and density 0 outside; endpoints have probability 0.

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7. Let X be uniform on $[-2, 1]$. Find $E(X)$.

Given: X is measured in units and is continuous with constant density on $[-2, 1]$ and density 0 outside; endpoints have probability 0.

8. Let X be uniform on $[-2, 2]$. Let X be uniform on $[-2, 2]$. Write the full piecewise CDF, with correct boundary branches.

Given: X is measured in units and is continuous with constant density on $[-2, 2]$ and density 0 outside; endpoints have probability 0.