Problem Sets due Jul 8, 2022 16:34 +03

Video

UCSDSE212017-V015800

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So to summarize, we talked about

cumulative distribution functions,

we defined them, we saw some of the properties

and we saw that they are useful

to calculate interval probabilities

and next time, we're going to talk about expectations.

See you then.

7.2_Cumulative_Distribution_Function

POLL

All cumulative distribution functions are:

RESULTS

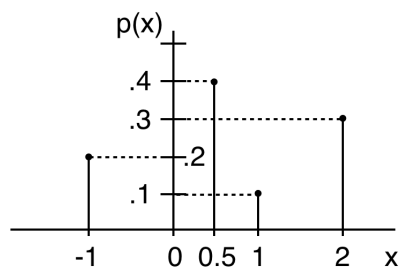|		
○	**Continuous.**	**16%**
○	**Left continuous.**	**7%**
◉	**Right continuous.**	**70%**
○	**None of the above.**	**7%**

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Results gathered from 43 respondents.

FEEDBACK

All cdf's are right continuous.

1 (Graded)

3/3 points (graded)
For the probability mass function

Find:

- $P(X=1)$,

| 0.1 | ✔ **Answer:** 0.1 |

0.1

Explanation
$P(X=1)=0.1$ from the figure.

- $P(X\geq 1)$,

| 0.4 | ✔ **Answer:** 0.4 |

0.4

Explanation
$P(X\geq 1)=P(X=1)+P(X=2)=0.4$.

- $P(X\in\mathbb{Z})$.

| 0.6 | ✔ **Answer:** 0.6 |

0.6

Explanation
$P(X\in\mathbb{Z})=P(X=-1)+P(X=0)+P(X=1)+P(X=2)=0.6$.

| Submit | You have used 1 of 4 attempts |

ⓘ   Answers are displayed within the problem

2 (Graded)

4/4 points (graded)
Recall that the "floor" of a real number x, denoted $\lfloor x \rfloor$, is the largest interger $\leq x$.

$$F(x)=\begin{cases} k-\frac{1}{\lfloor x\rfloor}, x\geq 1, \\ 0, x<1, \end{cases}$$ is a cummulative distribution function (cdf) for some fixed number k. Find:

- k,

| 1 | ✔ **Answer:** 1 |

1

Explanation
Recall that $F(\infty)=1$. Here $F(\infty)=k$, hence $k=1$.

- x_{min} (the smallest number with non-zero probability),

| 2 | ✔ **Answer:** 2 |

2

Explanation

Observe that $F(x) = 0$ for $x < 1$, and since $k = 1$, also $F(1) = 0$, hence the smallest number with non-zero probability is 2.

- $P(X = 4)$,

| 1/12 | ✔ **Answer:** 1/12 |

$\frac{1}{12}$

Explanation

$P(X = 4) = F(4) - F(3) = \frac{3}{4} - \frac{2}{3} = \frac{1}{12}$.

- $P(2 < X \le 5)$.

| 3/10 | ✔ **Answer:** 3/10 |

$\frac{3}{10}$

Explanation

$P(2 < X \le 5) = F(5) - F(2) = \frac{4}{5} - \frac{1}{2} = \frac{3}{10}$.

Submit You have used 1 of 4 attempts

ℹ Answers are displayed within the problem

3

0 points possible (ungraded)

Flip a coin with heads probability 0.6 repeatedly till it lands on tails, and let X be the total number of flips, for example, for h, h, t, $X = 3$. Find:

- $P(X \le 3)$,

| 0.784 | ✔ **Answer:** 0.784 |

0.784

Explanation

$P(X \le 3) = P(X = 1) + P(X = 2) + P(X = 3) = 0.4 + 0.6 \times 0.4 + 0.6 \times 0.6 \times 0.4 = 0.784$.

- $P(X \ge 5)$.

| 0.1296 | ✔ **Answer:** 0.1296 |

0.1296

Explanation

$P(X \ge 5) = 1 - P(X < 5) = 1 - P(X \le 4) = 1 - (P(X \le 3) + P(X = 4)) = 1 - (P(X \le 3) + 0.6 \times 0.6 \times 0.6 \times 0.4$
.

Submit You have used 1 of 4 attempts

ⓘ Answers are displayed within the problem

Discussion

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