Function of a random variable - Problems for Practice

23 February 2021

1) If the probability of density function of X is $f(x) = 2x, 0 < x < 1$,find the pdf of $Y = 3x + 1$.

   Ans: $f(y) = \frac{2}{9}(y - 1), 1 < y < 4$.

2) If the probability of density function of X is $f(x) = e^{-x}, x > 0$,find the pdf of $Y = 2x + 1$.

   Ans: $f(y) = \frac{1}{2}e^{\left(-\frac{1}{2}y-1\right)}, y > 1$.

3) If the random variable X is uniformly distributed in $(1,2)$ find the pdf of $Y = \frac{1}{X}$.

   Ans: $f(y) = \frac{1}{y^2}$ in $\frac{1}{2} < y < 1$.

4) If the random variable X $f(x) = 2x, 0 < x < 1$, find the pdf of $Y = e^{-x}$.

   Ans: $f(y) - \frac{2}{y}\log y$ in $\frac{1}{e} < y < 1$.

5) If X is uniformly distributed in $(0,1)$, find the pdf of $Y = \frac{1}{2X+1}$.

   Ans: $f(y) = \frac{1}{2y^2}$ in $\frac{1}{3} < y < 1$.

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