

CSE 312: Foundations of Computing II

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Lecture Topics: 4.4 Transforming Continuous RVs

[Tags: Transforming Continuous RVs]

1. Suppose $X \sim \text{Exp}\left(\lambda = \frac{1}{2}\right)$ is the waiting time in hours until your pizza delivery arrives, and suppose we decide to tip $Y = g(X) = \frac{24}{X+1}$ dollars.
 - a. What is the range, PDF, and CDF of X ? Hint: You can look this up.
 - b. What is the range Ω_Y ?
 - c. Find $F_Y(y)$ using the CDF method, then find $f_Y(y)$ afterwards.
 - d. Find $f_Y(y)$ using the explicit formula, after verifying the monotonicity and invertibility criteria.
 - e. Set up integrals for $E[Y]$ in two ways: one with LOTUS and $f_X(x)$, and one with $f_Y(y)$. Explicitly define your limits of integration and the integrand so that one could enter your integral into WolframAlpha.

[Bonus!]

2. Suppose $X \sim \text{Unif}(-1,1)$ (continuous), then find the PDF of $Y = X^2$. (Hint: Use the CDF method; why does the explicit formula not work in this case?).