Exam - Probabilities and Statistics

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iE

1 A contestant participates in a contest trying to win two prizes. His chance of winning two prizes are $\frac{2}{3}$ and $\frac{1}{3}$ respectively.

a) What is the probability that he wins exactly one prize?

b) Let X be the number of prizes won. What is the pdf of X?

c) What is the expected number of prizes he will win?

2 Let X be a r. v ~~and~~ Its pdf is $f_X(x) = \frac{1}{2} e^{-\frac{x}{2}}, x > 0$

What is the pdf of $Y = 2X + 1$?

3 Let $X_1, X_2, \dots, X_n$ be a sample from the ~~Gamma function~~ Gamma$(2, 2\theta)$ distribution, $\theta > 0$

a) Find method of moments estimator, $\hat{\theta}$ for θ.

b) Find maximum likehood estimator, $\bar{\theta}$ for θ.

c) Is $\bar{\theta}$ an absolutely correct estimator?