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MATH3423

QUIZ 1

1. Consider a r.s. with size n of X from a uniform distribution over $[0, \theta]$, where θ is positive and finite. Find an order statistic(s) with the smallest variance. Please justify your answer.

2. W is a r.v. from a normal distribution with mean 6 and variance 0.2. Now, a r.s. of size 50 is considered from the same distribution as W. Please approximate the probability that $\sum_{i=1}^{50} C_i > 400$, where $C_i = 40(W_i - 6)^2$, for $i = 1, \dots, 50$.

3. Just write down the exact distribution of the following question without proof.

i) If X and Y are independent rvs from $N(0, 1)$, then what is the distribution of $X^2 + Y^2$?

ii) If $X \sim N(0, 5)$, $Y \sim N(0, 21)$, and they are independent, then what is the distribution of $\frac{5Y^2 + 21X^2}{105}$?

iii) If $X_1 \sim N(0, 24)$, $X_2 \sim N(0, 21)$, and they are independent, then what is the joint distribution of $Y_1 = X_1 + X_2$ and $Y_2 = X_1 - X_2$?