

Math 421

Quiz 5

You should use the inside front cover of the textbook as a cheat sheet. You also should use the tables in the back of the textbook.

Justify all answers with neat and organized work. Clearly indicate your answers. 20 points possible.

1. (6 pts.) If X is $\chi^2(15)$, find the following.

(a) $P(5.229 < X < 22.31)$

(b) Constants a and b such that $P(a < X < b) = 0.90$ and $P(X < a) = 0.05$.

(c) The mean and variance of X .

(d) $\chi_{0.05}^2(15)$ and $\chi_{0.95}^2(15)$

2. (8 pts.) Let the distribution of Z be $N(0, 1)$. Use the second derivative of the p.d.f. of Z to find the points of inflection of the graph of the p.d.f.

3. (6 pts.) The joint p.m.f. of X and Y is $f(x, y) = (x + 2y)/18$, for $(x, y) = (1, 1)$, $(1, 2)$, $(2, 1)$, and $(2, 2)$.

(a) Find $f_X(x)$, the marginal p.m.f. of X .

(b) Find $f_Y(y)$, the marginal p.m.f. of Y .

(c) Find $P(X = Y)$.

(d) Find $P(Y \leq X^2 - 1)$.

(e) Are X and Y dependent or independent? Why?