

Name:

Quiz 11, Attempt 1

Let X_1, X_2, X_3 be independent identically distributed normal $N(0, 6)$ random variables. Find c such that

$$P\{X_1^2 + X_2^2 + X_3^2 \leq c\} = .95$$

Express your answer in terms of a percentile for a distribution that we know. For example, the 15th percentile of a $\chi^2(7)$ is written as $\chi^2_{0.15}(7)$.

$$.95 = P\left(\frac{X_1^2 + X_2^2 + X_3^2}{6} \leq \frac{c}{6}\right)$$

$$= P(\chi^2(3) \leq \frac{c}{6})$$

$$\Rightarrow \frac{c}{6} = \chi^2_{.95}(3)$$

$$\Rightarrow c = 6 \chi^2_{.95}(3)$$