Probability and Statistics II Review 1

1. Consider the sample $9, 7, 1, 4, 11, 3, 2, 6, 12$

   (a) Find the mean, variance, and standard deviation.

   (b) Find the 60th and 83rd percentiles.

2. Suppose the probability density function of X is $f(x) = \frac{3}{125}x^2$, for $0 \leq x \leq 5$. Find an equation for π_p, the quantile of order p. What is the 70th percentile of this distribution?

3. Let X and Y be random variables with joint p.d.f.

$$f(x, y) = c(2x + y), \text{ for } 0 < x < 1 \text{ and } 0 < y < 2.$$

Determine the following.

(a) c

(b) $P(2X + Y \leq 2)$

(c) The marginal p.d.f. of X

(d) μ_X and σ_X^2

(e) $E(XY)$

(f) Express $P(Y > 0.7 \mid X = 0.5)$ as an integral (you don't have to evaluate it).