STAT 479

Quiz 1

January 19, 2012

1. Wang Dental Insurance Company has received the following sample of claims:

   80 80 100 80 120

   Wang believes that dental claims are distributed as a Gamma distribution with $\alpha = 33$ and $\theta = 2.8$.

   VARSAM is the variance of the sample of claims.

   VARDIST is the variance based on the expected distribution.

   Calculate VARSAM – VARDIST.

Sample Data

$$E(x) = \frac{80+80+100+80+120}{5} = 92$$

$$E(x^2) = \frac{3(80)^2 + (100)^2 + (120)^2}{5} = 8720$$

$$VARSAM = 8720 - (92)^2 = 256$$

Gamma

$$Var = \alpha\theta^2 = (33)(2.8)^2 = 258.72$$

$$VARSAM - VARDIST = 256 - 258.72$$

$$= -2.72$$

2. You are given $F(x) = \frac{x^2}{100}$ for $0 < x < 10$.

Calculate $e(5)$. This is $E[(X-5 \mid X > 5)]$.

$f(x) = F'(x)$

$= \frac{2x}{100} = \frac{x}{50}$

$$e(5) = E[(x-5 \mid x > 5]$$

$$= \frac{\int_5^{10} (x-5) f(x)\,dx}{1 - F(5)}$$

$$= \frac{\int_5^{10} (x-5)\left(\frac{x}{50}\right) dx}{1 - \frac{25}{100}}$$

$$= \frac{\frac{1}{50}\left(\frac{x^3}{3} - \frac{5x^2}{2}\right)\Big|_5^{10}}{0.75}$$

$$= \frac{\frac{1}{50}\left[\frac{1000}{3} - \frac{5(100)}{2}\right] - \frac{1}{50}\left[\frac{125}{3} - \frac{125}{2}\right]}{0.75}$$

$= 2.778$