Question #104
Key: C

$$E[N] = E_{\Lambda}\left[E[N|\Lambda]\right] = E_{\Lambda}[\Lambda] = 2$$

$$Var[N] = E_{\Lambda}\left[Var[N|\Lambda]\right] + Var_{\Lambda}\left[E[N|\Lambda]\right]$$

$$= E_{\Lambda}[\Lambda] + Var_{\Lambda}[\Lambda] = 2 + 2 = 4$$

Distribution is negative binomial (Loss Models, 3.3.2)

Per supplied tables

$$mean = r\beta = 2$$

$$Var = r\beta(1+\beta) = 4$$

$$(1+\beta) = 2$$

$$\beta = 1$$

$$r\beta = 2$$

$$r = 2$$

From tables

$$p_3 = \frac{r(r+1)(r+2)\beta^3}{3!(1+\beta)^{r+3}} = \frac{(2)(3)(4)1^3}{3!2^5} = \frac{4}{32} = 0.125$$

1000 $p_3 = 125$