

**Question #111****Key: E**

Treat as three independent Poisson variables, corresponding to 1, 2 or 3 claimants.

$$\text{rate}_1 = 6 \quad \left[ = \frac{1}{2} \times 12 \right]$$

$$\text{rate}_2 = 4$$

$$\text{rate}_3 = 2$$

$$\text{Var}_1 = 6$$

$$\text{Var}_2 = 16 \quad \left[ = 4 \times 2^2 \right]$$

$$\text{Var}_3 = 18$$

total Var =  $6 + 16 + 18 = 40$ , since independent.

Alternatively,

$$E(X^2) = \frac{1^2}{2} + \frac{2^2}{3} + \frac{3^2}{6} = \frac{10}{3}$$

For compound Poisson,  $\text{Var}[S] = E[N]E[X^2]$

$$= (12) \left( \frac{10}{3} \right) = 40$$