

Question #102**Key: E**

Model Solution:

$$\begin{aligned}\text{Expected insurance benefits per factory} &= E[(X - 1)_+] \\ &= 0.2 \times 1 + 0.1 \times 2 = 0.4.\end{aligned}$$

$$\text{Insurance premium} = (1.1) (2 \text{ factories}) (0.4 \text{ per factory}) = 0.88.$$

Let R = retained major repair costs, then

$$f_R(0) = 0.4^2 = 0.16$$

$$f_R(1) = 2 \times 0.4 \times 0.6 = 0.48$$

$$f_R(2) = 0.6^2 = 0.36$$

$$\begin{aligned}\text{Dividend} &= 3 - 0.88 - R - (0.15)(3), \text{ if positive} \\ &= 1.67 - R, \text{ if positive}\end{aligned}$$

$$E(\text{Dividend}) = (0.16)(1.67 - 0) + (0.48)(1.67 - 1) + (0.36)(0) = 0.5888$$

[The $(0.36)(0)$ term in the last line represents that with probability 0.36, $(1.67 - R)$ is negative so the dividend is 0.]