50. X: # of snowstorms

Y: Payout

$$Y = \begin{cases} 0 & X \le 1 \\ 10{,}000X - 10{,}000 & X > 1 \end{cases} \qquad E(Y) = ?$$

$$E(Y) \neq E(10{,}000X - 10{,}000)$$

$$E(10{,}000X - 10{,}000) =$$

$$-10{,}000 \cdot P(X=0) + 0 \cdot P(X=1) + 10{,}000 \cdot P(X=2) + 20{,}000 \cdot P(X=3) + \dots$$

We want:

$$E(Y) = 10{,}000 \cdot P(X=2) + 20{,}000 \cdot P(X=3) + 30{,}000 \cdot P(X=4) + \dots$$

→ notice the first term in $E(10{,}000X - 10{,}000)$ is different, so we can just take this out.

→ $E(10{,}000X - 10{,}000) - (-10{,}000 \cdot P(X=0))$

$= 10{,}000E(X) - 10{,}000 + 10{,}000 \cdot P(X=0)$ ←

$= 10{,}000(1.5) - 10{,}000 + 10{,}000e^{-1.5}$

$= 7231$

(C)

$X \sim \text{Poisson}(\lambda = 1.5)$

$P(X=k) = \dfrac{\lambda^k e^{-\lambda}}{k!}$

$P(X=0) = \dfrac{1.5^0 e^{-1.5}}{0!}$

$= e^{-1.5}$

$E(X) = 1.5$