

Exam P Problem 53

Given that the policy holder's loss Y

$$f(y) = \begin{cases} \frac{2}{y^3} & \text{for } y > 1 \\ 0 & \text{otherwise} \end{cases}$$

Benefit limit is 10

Let W denote the claim payment as W

$$W = \begin{cases} y & \text{for } 1 < y \leq 10 \\ 10 & \text{for } y > 10 \end{cases}$$

$$E[W] = E[W_1 \text{ when } 1 < y \leq 10] + E[W_2 \text{ when } y > 10]$$

$$= \int_1^{10} W_1 f(y) dy + \int_{10}^{\infty} W_2 f(y) dy$$

$$= \int_1^{10} y f(y) dy + \int_{10}^{\infty} 10 f(y) dy$$

$$= \int_1^{10} y \frac{2}{y^3} dy + \int_{10}^{\infty} 10 \frac{2}{y^3} dy$$

$$= -\frac{2}{y} \Big|_1^{10} - \frac{10}{y^2} \Big|_{10}^{\infty}$$

$$= 1.9 \quad \boxed{D}$$