

Problem 152

X: # of low risk before claim

Y: # of high risk before claim

$$P(\text{low claim}) = .1$$

$$P(\text{high claim}) = .2$$

$P(X < Y) \Rightarrow$

X	Y	P
0	> 0	$.1(.8)$
1	> 1	$.9(.1)(.8)^2$
2	> 2	$(.9)^2(.1)(.8)^3$
3	> 3	$(.9)^3(.1)(.8)^4$
\vdots	\vdots	\vdots

$$\text{Pattern: } \sum_{i=0}^{\infty} (.1)(.9)^i(.8)^{i+1} = \sum_{i=0}^{\infty} (.1)(.8) [(.9)(.8)]^i = \sum_{i=0}^{\infty} (.08)(.72)^i$$

$$\text{Geometric Series } \Rightarrow \sum_{k=0}^{\infty} a \cdot r^k = \frac{a}{1-r}$$

$$P(X < Y) = \frac{.08}{1-.72}$$

$$= \underline{\underline{.2857}} \quad \boxed{A}$$