

31. Solution: D

Let X denote the number of employees that achieve the high performance level. Then X follows a binomial distribution with parameters $n = 20$ and $p = 0.02$. Now we want to determine x such that

$$\Pr[X > x] \leq 0.01$$

or, equivalently,

$$0.99 \leq \Pr[X \leq x] = \sum_{k=0}^x \binom{20}{k} (0.02)^k (0.98)^{20-k}$$

The following table summarizes the selection process for x :

x	$\Pr[X = x]$	$\Pr[X \leq x]$
0	$(0.98)^{20} = 0.668$	0.668
1	$20(0.02)(0.98)^{19} = 0.272$	0.940
2	$190(0.02)^2(0.98)^{18} = 0.053$	0.993

Consequently, there is less than a 1% chance that more than two employees will achieve the high performance level. We conclude that we should choose the payment amount C such that

$$2C = 120,000$$

or

$$C = 60,000$$