150. Key: B

The 95th percentile is in the range when an accident occurs. It is the 75th percentile of the payout, given that an accident occurs, because \((0.95 - 0.80)/(1 - 0.80) = 0.75\). Letting \(x\) be the 75th percentile of the given exponential distribution, \(F(x) = 1 - e^{-\frac{x}{3000}} = 0.75\), so \(x = 4159\). Subtracting the deductible of 500 gives 3659 as the (unconditional) 95th percentile of the insurance company payout.

151. Key: C

The ratio of the probability that one of the damaged pieces is insured to the probability that none of the damaged pieces are insured is \(\frac{\binom{r}{27-r}}{\binom{27}{4}} = \frac{4r}{24 - r}\), where \(r\) is the total number of pieces insured. Setting this ratio equal to 2 and solving yields \(r = 8\).

The probability that two of the damaged pieces are insured is \(\frac{\binom{r}{27-r}}{\binom{27}{4}} = \frac{\binom{8}{27}}{\binom{27}{4}} = \frac{(8)(7)(19)(18)(4)(3)(2)(1)}{(27)(26)(25)(24)(2)(1)(2)(1)} = \frac{266}{975} = 0.27\).

152. Key: A

The probability that Rahul examines exactly \(n\) policies is \(0.1 \cdot 0.9^{n-1}\). The probability that Toby examines more than \(n\) policies is \(0.8^n\). The required probability is thus \(\sum_{n=1}^{\infty} 0.1 \cdot 0.9^{n-1} \cdot 0.8^n = \frac{1}{9} \sum_{n=1}^{\infty} 0.72^n = \frac{0.72}{9} \frac{1}{1 - 0.72} = 0.2857\).