

SOLUTIONS

King Fahd University of Petroleum & Minerals
Department of Mathematics & Statistics

STAT-319-Term063-Quiz2

Name: _____

ID: _____

Serial: _____

Question1. (3-points)

Disks of polycarbonate plastic from a supplier are analyzed for scratch and shock resistance. The results from 100 disks are summarized as follows:

Scratch Resistance	Shock Resistance		Total
	High	Low	
High	70	9	79
Low	16	5	21
Total	86	14	100

Let A denote the event that a disk has high shock resistance, and let B denote the event that a disk has high scratch resistance. Determine the following probabilities:

a. $P(A) \Rightarrow P(A) = \frac{86}{100} = 0.86$ (1-Point)

b. $P(B|A) \Rightarrow P(B|A) = \frac{P(A \cap B)}{P(A)} = \frac{70/100}{86/100} = \frac{70}{86} = 0.8140$ (2-Points)

Question2.(7-Points)

Customers are used to evaluate preliminary product designs. In the past, 95% of highly successful products received good reviews, 60% of moderately successful products received good reviews, and 10% of poor products received good reviews. In addition, 40% of products have been highly successful, 35% have been moderately successful, and 25% have been poor products.

a. What is the probability that a product attains a good review?

Let B_1 : The product has been highly successful

B_2 : The product has been moderately successful

B_3 : The product has been poorly successful

Let A: A product attains good reviews

$$\begin{aligned} P(A) &= P(A|B_1)P(B_1) + P(A|B_2)P(B_2) + P(A|B_3)P(B_3) \\ &= (0.95).(0.40) + (0.60).(0.35) + (0.10).(0.25) \quad (5-Points) \\ &= 0.38 + 0.21 + 0.025 = 0.615 \end{aligned}$$

b. If a new design attains a good review, what is the probability that it will be a highly successful product?

$$P(B_1|A) = \frac{P(A \cap B_1)}{P(A)} = \frac{P(A|B_1)P(B_1)}{P(A)} = \frac{(0.95).(0.40)}{0.615} = 0.617 \quad (2-Points)$$