Assignment 1

AI1110: Probability and Random Variables
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10.13.3.40: Question.A lot consists of 48 mobile phones of which 42 are good, 3 have only minor defects and 3 have major defects. Varnika will buy a phone if it is good but the trader will only buy a mobile if it has no major defect. One phone is selected at random from the lot. What is the probability that it is

1) acceptable to Varnika?
2) acceptable to the trader?

Answer:

1) $\frac{7}{8}$
2) $\frac{15}{16}$

Solution:

Let X be the random variable representing the selected mobile phone,then X can be the values 0,1,2 where,

Variable	Defect	Remarks
(X=0)	A phone with major defects	Not acceptable to both
(X=1)	A phone with minor defects	Acceptable to Trader
(X=2)	A good phone with no defects	Acceptable to Varnika

TABLE 2: Given Information

We can define the probability mass function (pmf) of X as follows:

$$\Pr(X=0) = \frac{3}{48} \tag{1}$$
$$\Pr(X=1) = \frac{3}{48} \tag{2}$$
$$\Pr(X=2) = \frac{42}{48} \tag{3}$$

1) Probability that the selected mobile phone is acceptable to Varnika is $\Pr(X=2)$:

$$\Pr(X=2) = \frac{42}{48} \tag{4}$$
$$= \frac{7}{8} \tag{5}$$

2) Probability that the selected mobile phone is acceptable to the trader is 1-$\Pr(X=0)$:

$$1 - \Pr(X=0) = 1 - \frac{3}{48} \tag{6}$$
$$= \frac{45}{48} \tag{7}$$
$$= \frac{15}{16} \tag{8}$$