

Math 323 Homework # 1

P74. 2.17. A manufacturing company has two retail outlets. It is known that 30% of the potential customers buy products from outlet I alone; 50% buy from outlet II alone; 10% buy from both I and II; and 10% buy from neither. Let A denotes the event that a potential customer, randomly chosen, buys from I and B denotes the event that the customer buys from II. Find the following probabilities:

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|----|----------------------------|----|-----------------------|
| a. | $P(A)$, | b. | $P(A \cup B)$, |
| c. | $P(\bar{B})$, | d. | $P(AB)$, |
| e. | $P(A \cup \bar{B})$, | f. | $P(\bar{A}\bar{B})$, |
| g. | $P(\overline{A \cup B})$. | | |

Solution: Translation:

$$P(A\bar{B}) = .3, \quad P(B\bar{A}) = .5,$$

$$P(AB) = .1, \quad P(\bar{A}\bar{B}) = .1.$$

a.

$$P(A) = .3 + .1 = .4$$

b.

$$P(A \cup B) = .3 + .1 + .5 = .9$$

c.

$$P(\bar{B}) = 1 - (.1 + .5) = .4$$

d.

$$P(AB) = .1$$

e.

$$P(A \cup \bar{B}) = 1 - P(\bar{A}B) = 1 - .5 = .5$$

f.

$$P(\bar{A}\bar{B}) = .1$$

g.

$$P(\overline{A \cup B}) = P(\bar{A}\bar{B}) = .1$$