

2.66

(A) $37\% \quad P = 0.37\#$

(B) $37\% + 25\% + 30\% = 87\% \quad P = 0.87\#$

(C) $P = 0.17\# \quad (D) P = 0.63\#$

If an accident report is selected randomly from the 300 reports,

- what is the probability that the accident occurred on the graveyard shift?
- what is the probability that the accident occurred due to human error?
- what is the probability that the accident occurred due to unsafe conditions?
- what is the probability that the accident occurred on either the evening or the graveyard shift?

2.82 For married couples living in a certain suburb, the probability that the husband will vote on a bond referendum is 0.2, the probability that the wife will vote on the referendum is 0.28, and the probability that both the husband and the wife will vote is 0.15. What is the probability that

- at least one member of a married couple will vote?
- a wife will vote, given that her husband will vote?
- a husband will vote, given that his wife will not vote?

2.87

(A) $0.7 + 0.78 - 0.15 = 0.33\#$

(B) $P(W|H) = \frac{0.15}{0.28} = 0.53\#$

(C)

$P(H|W) = \frac{0.15}{0.2} = 0.694\#$

2.90 Pollution of the rivers in the United States has been a problem for many years. Consider the following events:

A : the river is polluted,

B : a sample of water tested detects pollution,

C : fishing is permitted.

Assume $P(A) = 0.3$, $P(B|A) = 0.75$, $P(B|A') = 0.20$, $P(C|A \cap B) = 0.20$, $P(C|A' \cap B) = 0.15$, $P(C|A \cap B') = 0.80$, and $P(C|A' \cap B') = 0.90$.

(a) Find $P(A \cap B \cap C)$.

(b) Find $P(B' \cap C)$.

(c) Find $P(C)$.

(d) Find the probability that the river is polluted, given that fishing is permitted and the sample tested did not detect pollution.

(c)

$$P(C) = P(A \cap B \cap C) + P(A \cap B' \cap C) + P(A' \cap B \cap C) + P(A' \cap B' \cap C)$$

$$+ P(A \cap B \cap C')$$

$$+ P(A \cap B' \cap C')$$

$$+ P(A' \cap B \cap C')$$

$$= 0.564 + 0.15 \times 0.2 \times 0.7$$

$$+ 0.045$$

$$= 0.63 \#$$

$$(a) P(A \cap B \cap C) = P(A \cap B) \cdot P(C|A \cap B)$$

$$= P(A) \cdot P(B|A) \cdot P(C|A \cap B)$$

$$= 0.3 \times 0.75 \times 0.2$$

$$= 0.045 \#$$

(d)

$$P(A|B' \cap C)$$

$$= \frac{P(A \cap B' \cap C)}{P(B' \cap C)}$$

$$= \frac{0.06}{0.564} = 0.106 \#$$

$$(b) P(B' \cap C) = P(A \cap B' \cap C) + P(A' \cap B' \cap C)$$

$$= P(A \cap B') \cdot P(C|A \cap B')$$

$$+ P(A' \cap B') \cdot P(C|A' \cap B')$$

$$= P(A) \cdot P(B'|A) \cdot P(C|A \cap B')$$

$$+ P(A') \cdot P(B'|A') \cdot P(C|A' \cap B')$$

$$= 0.3 \times 0.25 \times 0.8 + 0.7 \times 0.8 \times 0.9$$

$$= 0.564 \#$$

2.100 A regional telephone company operates three identical relay stations at different locations. During a one-year period, the number of malfunctions reported by each station and the causes are shown below.

Station	<i>A</i>	<i>B</i>	<i>C</i>
Problems with electricity supplied	2	1	1
Computer malfunction	4	3	2
Malfunctioning electrical equipment	5	4	2
Caused by other human errors	7	7	5

Suppose that a malfunction was reported and it was found to be caused by other human errors. What is the probability that it came from station *C*?

2.126 During bad economic times, industrial workers are dismissed and are often replaced by machines. The history of 100 workers whose loss of employment is attributable to technological advances is reviewed. For each of these individuals, it is determined if he or she was given an alternative job within the same company, found a job with another company in the same field, found a job in a new field, or has been unemployed for 1 year. In addition, the union status of each worker is recorded. The following table summarizes the results.

	Union	Nonunion
Same Company	40	15
New Company (same field)	13	10
New Field	4	11
Unemployed	2	5

- (a) If the selected worker found a job with a new company in the same field, what is the probability that the worker is a union member?
- (b) If the worker is a union member, what is the probability that the worker has been unemployed for a year?

2. 110

$$\frac{5}{19} = 0.263 \#$$

2. 126

$$(a) \frac{10}{25} = 0.565 \#$$

(b)

$$\frac{2}{59} = 0.034 \#$$

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討論

Matlab

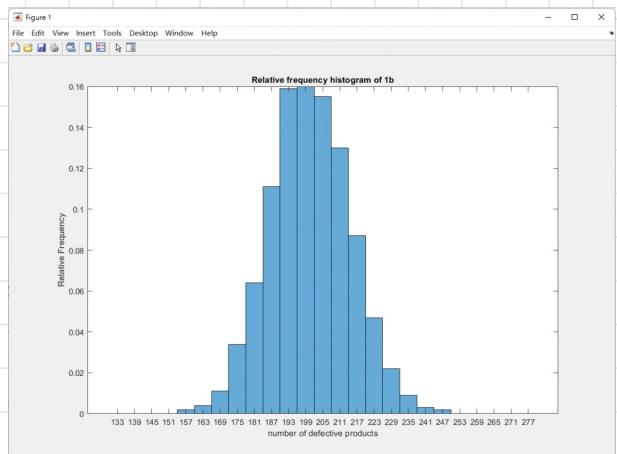
①a. num \Rightarrow 產品數量

rate \Rightarrow defective rate 模擬

用 "machine" function

用 rand 產生亂數， $40 \leq \text{rate} \leq 10$ 代表 defective

①b



①c

$$P(B_3 | A) = 0.204 (7.47, 795)$$

而實際數據並無相差太多

1	2	3	4	5	6	7	8	9	10	
1	0.2160	0.2124	0.2030	0.2002	0.2110	0.2098	0.2133	0.1956	0.2039	0.2185