Author: Naga Karthik

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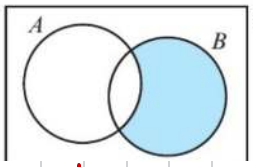
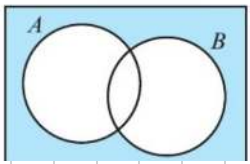
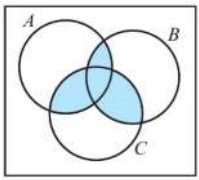
2.1: Set Notation

① a 

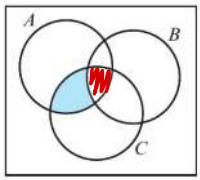
$A' \cap B$

b 

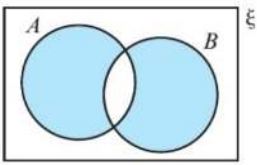
$(A \cap B)'$

e 

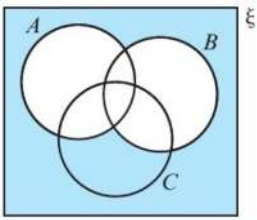
$(A \cap B) \cup (A \cap C) \cup (B \cap C)$

f 

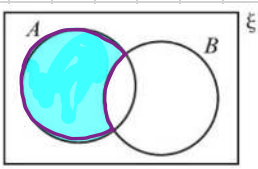
$A \cap C \cap B'$

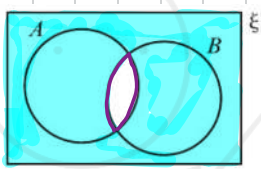
c 

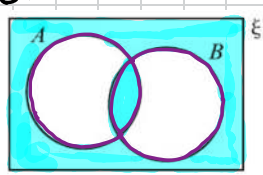
$(A \cap B') \cup (B \cap A')$

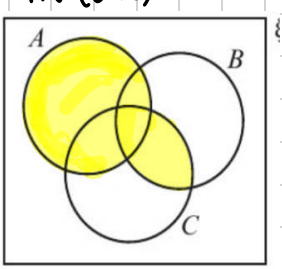
d 

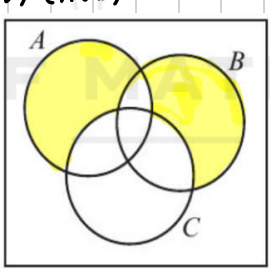
$(A \cup B)'$

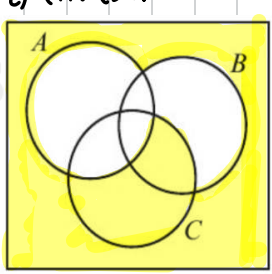
② a) $A \cap B'$ 

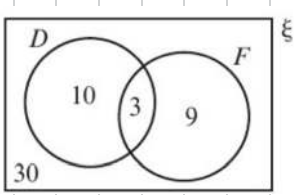
b) $A' \cup B'$ 

c) $(A \cap B) \cup (A' \cap B')$ 

③ a) $A \cup (B \cap C)$ 

b) $(A \cup B) \cap C'$ 

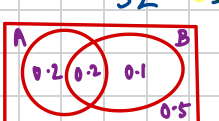
c) $(A \cup (B \cap C'))'$ 

④ 

a) $P(F) = \frac{12}{52} = \frac{3}{13}$ b) $P(D) = \frac{13}{52} = \frac{1}{4}$ c) $P(D \cap F) = \frac{3}{52}$

d) $P(D \cup F) = \frac{22}{52} = \frac{11}{26}$ e) $P(F') = \frac{40}{52} = \frac{10}{13}$ f) $P(D' \cap F) = \frac{9}{52}$

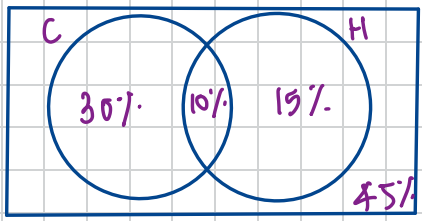
⑤ $P(A) = 0.4$ $P(B) = 0.3$ $P(A \cap B) = 0.2$



a) $P(A \cup B) = 0.5$ b) $P(A') = 1 - 0.4 = 0.6$ c) $P(A' \cap B) = 0.1$ d) $P(A' \cap B') = 0.5$

(6) 40% → 0.4 → car insurance (C) 45% of → neither
25% → 0.25 → home insurance (H)

a)

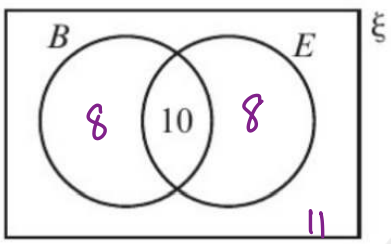


⇒ 45% + 30% + 10% + 15% = 100%.

b) i) $P(C \cap H) = 0.1$ ii) $P(C \cap H') = 0.3$

iii) $P(H \cap C') = 0.15$

(7) a)



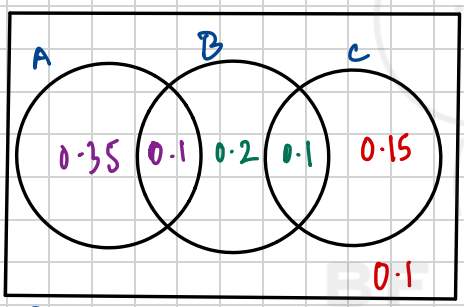
1 - Green
18 - Red
18 - Black
18 - Even
37 - 26 = 11

b) i) $P(B \cup E) = \frac{26}{37}$

ii) $P(B' \cap E) = \frac{8}{37}$

iii) $P((B \cap E)') = \frac{27}{37}$

(8) a)



only A = $\frac{7}{20}$ only B = $\frac{4}{20}$ only C:

A & B = $\frac{2}{20} = 0.1$ B & C = $\frac{2}{20}$ $P(C) = 0.25$

$P(A) = 0.45$ $P(B) = 0.4$

$P(A \cap B \cap C)' = 1 - 0.9 = 0.1$

b) i) $P(A \cap C) = 0$ ii) $P(B) \cap P(C) = P(B) \times P(C) = 0.1 = 0.4 \times 0.25$

⇒ $0.1 = 0.1$ It is independent.

c) i) $P(A' \cap C') = 0.2 + 0.1 = 0.3$

ii) $P(A \cup (B' \cup C)) = 0.45 + 0.25 + 0.15 = 0.8$

iii) $P((A \cup C)' \cap B) = 0.2$