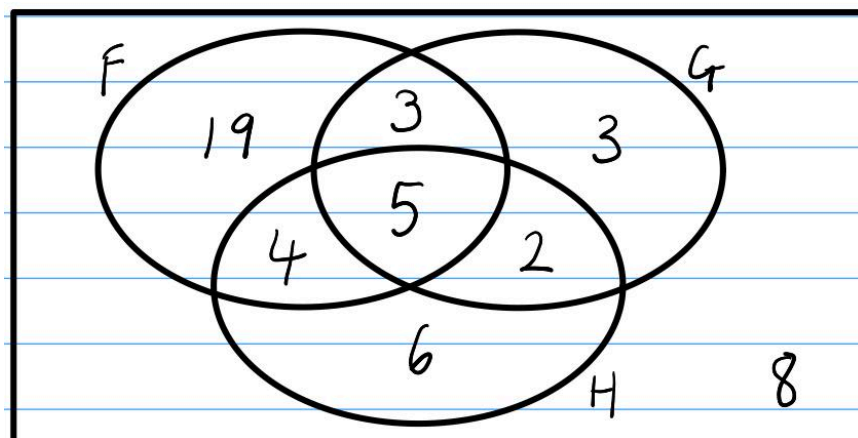


- 1
- (a) •  $A$  and  $C$  (B1)
- (b) • Use independence:  $P(A) \times P(B) = P(A \cap B)$  (M1)  
•  $0.4 \times P(B) = 0.15 \implies P(B) = 0.375$  (A1)  
•  $p = 0.375 - 0.15 - 0.1 = 0.125$  (A1)  
•  $q = 0.3 - 0.125 = 0.175$  (A1)  
•  $r = 1 - (0.25 + 0.15 + 0.1 + 0.125 + 0.175) = 0.2$  (A1)
- 
- (Total for question 1 is 6 marks)

- 2
- (a) •  $A$  and  $C$  [or  $B$  and  $C$ ] (B1)
- (b) •  $p = 0.4 - 0.2 = 0.2$  (B1)  
•  $q = 0.7 - 0.4 = 0.3$  (B1)  
•  $r = 1 - 0.7 - 0.1 = 0.2$  (B1)
- (c) • Check  $P(A) \times P(B) = P(A \cap B)$   
•  $0.4 \times 0.5 = 0.2$  (M1)  
•  $P(A \cap B) = 0.2 \therefore A$  and  $B$  are independent. (A1)
- 
- (Total for question 2 is 5 marks)

3

(a)



- Correct intersections (5, 3, 4, 2) (B1)
- Correct single regions (19, 3, 6) (B1)
- Correct outside region (8) (B1)

(b)

- $\frac{31}{50} \times \frac{30}{49}$  (M1)
- $= \frac{93}{245}$  (A1)

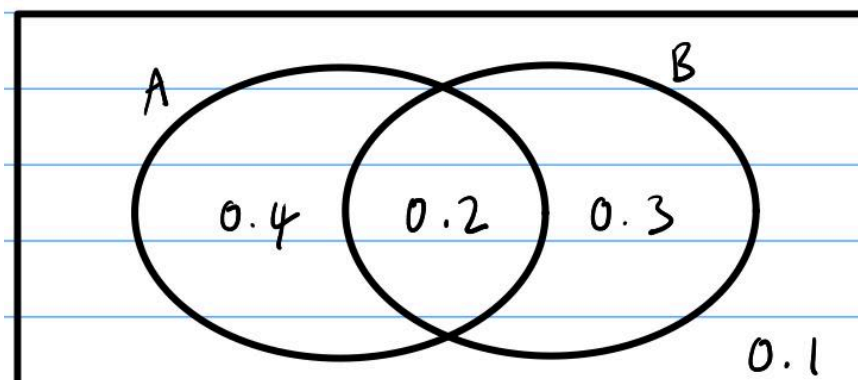
(Total for question 3 is 5 marks)

4

(a)

- $P(A \cup B) = 1 - 0.1 = 0.9$  (M1)
- $P(A \cap B) = 0.6 + 0.5 - 0.9 = 0.2$  (A1)

(b)



- Correct intersection 0.2 (B1)
- Correct regions 0.4, 0.3 and 0.1 (B1)

(c)

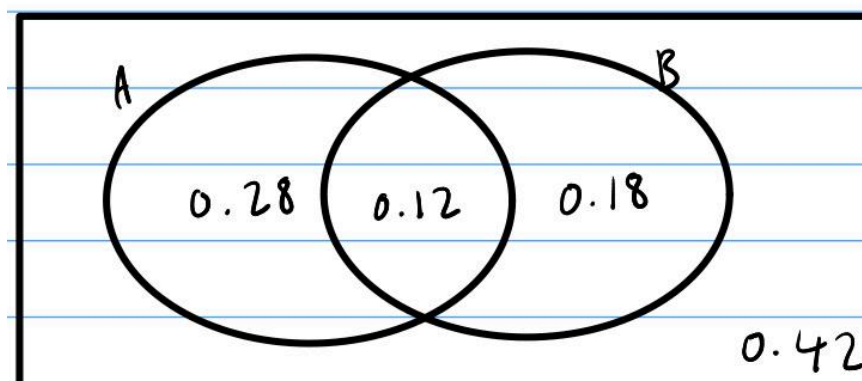
- $0.6 \times 0.5 = 0.3$  (M1)
- $0.2 \neq 0.3 \therefore$  not independent (A1)

(Total for question 4 is 6 marks)

5

- (a)
- If independent  $P(A) \times P(B) = P(A \cap B)$  (M1)
  - $0.4 \times 0.3 = 0.12$  (A1)

(b)



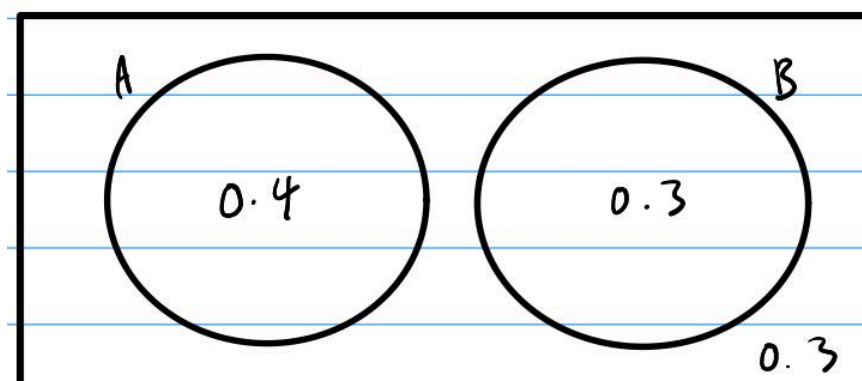
- Intersection 0.12 (B1)
- Other regions 0.28, 0.18, 0.42 (B1)

(Total for question 5 is 5 marks)

6

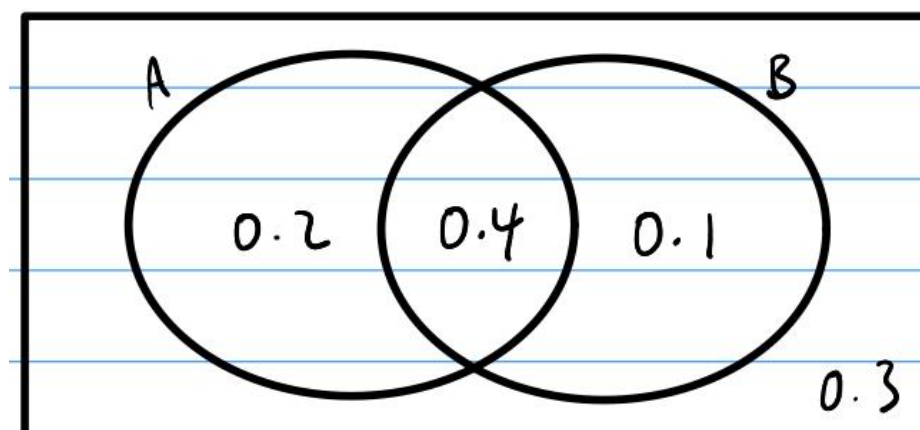
- (a)
- $P(A \text{ and } B) = 0$  (B1)

(b)



- Two separate circles (B1)
- Correct probabilities 0.4 and 0.3 (B1)
- Correct outside region 0.3 (B1)

(Total for question 6 is 4 marks)



- Intersection 0.4 (B1)
- A only 0.2 and B only 0.1 (B1)
- Outside 0.3 (B1)

(Total for question 7 is 3 marks)