

# Assignment

Barath surya M — EE22BTECH11014

## Question 11.16.3.11

The accompanying venn diagram shows three events, A, B and C, and also the probabilities of the various intersections (for instance,  $\Pr(AB) = 0.7$ ). Determine

- 1)  $\Pr(A)$
- 2)  $\Pr(BC')$
- 3)  $\Pr(A + B)$
- 4)  $\Pr(AB')$
- 5)  $\Pr(BC)$
- 6) Probability of exactly one of the three occurs

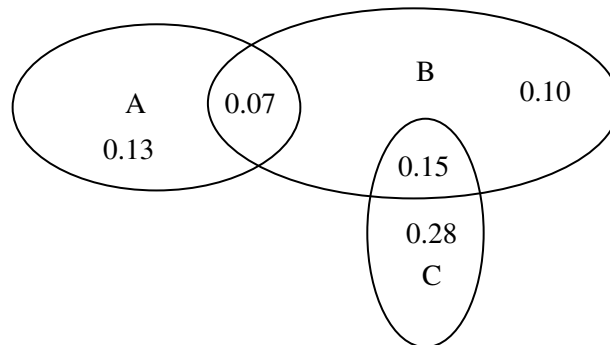


Fig. 1: generated by Latextikz

**Solution:** Given:

$$\Pr(AB) = 0.07 \quad (1)$$

$$\Pr(A) - \Pr(AB) = 0.13 \quad (2)$$

$$\Pr(BC) = 0.15 \quad (3)$$

$$\Pr(B) - \Pr(AB) - \Pr(BC) = 0.10 \quad (4)$$

$$\Pr(C) - \Pr(CB) = 0.28 \quad (5)$$

1)

$$\Pr(A) = 0.13 + 0.07 \quad (6)$$

$$= 0.2 \quad (7)$$

2)

$$\implies B = B(C + C') \quad (8)$$

$$\implies \Pr(B) = \Pr(BC + BC') \quad (9)$$

$$= \Pr(BC) + \Pr(BC') - \Pr(BCC') \quad (10)$$

$$= \Pr(BC) + \Pr(BC') \quad (11)$$

$$\Pr(BC') = \Pr(B) - \Pr(BC) \quad (12)$$

$$= 0.07 + 0.10 + 0.15 - 0.15 \quad (13)$$

$$= 0.17 \quad (14)$$

3)

$$\Pr(A + B) = \Pr(A) + \Pr(B) - \Pr(AB) \quad (15)$$

$$= 0.20 + (0.07 + 0.10 + 0.15) - 0.07 \quad (16)$$

$$= 0.45 \quad (17)$$

4)

$$\implies A = A(B + B') \quad (18)$$

$$\implies \Pr(A) = \Pr(AB + AB') \quad (19)$$

$$= \Pr(AB) + \Pr(AB') - \Pr(ABB') \quad (20)$$

$$= \Pr(AB) + \Pr(AB') \quad (21)$$

$$\Pr(AB') = \Pr(A) - \Pr(AB) \quad (22)$$

$$= 0.20 - 0.07 \quad (23)$$

$$= 0.13 \quad (24)$$

5)

$$\Pr(BC) = 0.15 \quad (25)$$

6)

$$\Pr(\text{exactly one of the 3 occurs}) = 0.13 + 0.10 + 0.28 \quad (26)$$

$$= 0.51 \quad (27)$$