Ex 1.5

Q1 (i) $\frac{8}{16} = \frac{1}{2}$

(ii) $4/16 = 1/4$

(iii) or = Add $\frac{8}{16} + \frac{4}{16} = \frac{12}{16} = \frac{3}{4}$

Q2 (i) $P(\text{Spade}) = 13/52 = 1/4$

(ii) $P(\text{red pic}) = 6/52 = 3/26$

(iii) $P(\text{spade or red pic}) = 13/52 + 6/52 = 19/52$

Q3 (i) $P(\text{mult of } 3) = 10/30 = 1/3$

(ii) $P(\text{mult of } 5) = 6/30 = 1/5$

(iii) Not mutually exclusive as 15 and 30 are both mult of 3 and mult of 5

$P(\text{mult of 3 or 5}) = 10/30 + 6/30 - 2/30 = 14/30 = 7/15$

Q4 (i) $P(\text{even}) = 6/12 = 1/2$

(ii) $P(\text{mult of } 3) = 4/12 = 1/3$

(iii) $P(\text{even or Mult of } 3) = 6/12 + 4/12 - 2/12 = 8/12 = 2/3$

Q5 (i) $P(\text{club}) = \frac{13}{52} = \frac{1}{4}$

(ii) $P(\text{King}) = \frac{4}{52} = \frac{1}{13}$

(iii) $P(\text{club or K}) = \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} = \frac{4}{13}$

(iv) $P(\text{red}) = \frac{26}{52} = \frac{1}{2}$

(v) $P(\text{Q}) = \frac{4}{52} = \frac{1}{13}$

(vi) $P(\text{Red or Q}) = \frac{26}{52} + \frac{4}{52} - \frac{2}{52} = \frac{28}{52} = \frac{7}{13}$

Q6 (i) $P(\text{Same N°}) = \frac{6}{36} = \frac{1}{6}$

(ii) $P(\text{Total of 8}) = \frac{5}{36}$ (2,6)(6,2)(3,5)(5,3)(4,4)

(iii) $P(\text{Same N° or Total 8}) = \frac{6}{36} + \frac{5}{36} - \frac{1}{36} = \frac{10}{36} = \frac{5}{18}$

Q7 (i) $P(\text{G}) = \frac{14}{28} = \frac{1}{2}$ Total - 28.

(ii) $P(\text{not 5yrs}) = \frac{21}{28} = \frac{3}{4}$

(iii) $P(\text{B, 6 yrs}) = \frac{8}{28} = \frac{2}{7}$

(iv) $P(\text{G or 6 yrs}) = \frac{14}{28} + \frac{14}{28} - \frac{6}{28} = \frac{22}{28} = \frac{11}{14}$

(v) $P(\text{6 or 7 yrs}) = \frac{21}{28} = \frac{3}{4}$

(vi) $P(\text{6 and 7 yrs}) = \frac{0}{28} = 0$

Q8 (i) $P(G, Est) = \frac{32}{200} = \frac{4}{25}$ Total = 200.

(ii) $P(Saloon) = \frac{100}{200} = \frac{1}{2}$

(iii) $P(Black\ or\ est) = \frac{12}{200} + \frac{100}{200} - \frac{6}{200} = \frac{106}{200} = \frac{53}{100}$

Q9 (i) $P(1^{st}\ Row) = \frac{4}{16} = \frac{1}{4}$

(ii) $P(1^{st}\ Column) = \frac{4}{16} = \frac{1}{4}$

(iii) $P(1^{st}\ Row\ or\ 1^{st}\ Column) = \frac{4}{16} + \frac{4}{16} - \frac{1}{16} = \frac{7}{16}$

(iv) $P(edge) = \frac{12}{16} = \frac{3}{4}$

(v) $P(Diag) = \frac{4}{16} = \frac{1}{4}$

(vi) $P(edge\ or\ Diag) = \frac{12}{16} + \frac{4}{16} - \frac{2}{16} = \frac{14}{16} = \frac{7}{8}$

(vii) $P(sq\ or\ odd\ N^o) = \frac{4}{16} + \frac{8}{16} - \frac{2}{16} = \frac{10}{16} = \frac{5}{8}$

Q10 $P(G) = \frac{1}{5}$ $N^o\ of\ G = n$ Total = $20+n$

$$P(G) = \frac{n}{20+n} = \frac{1}{5}$$
$$5n = 20+n$$
$$4n = 20$$
$$n = 5$$

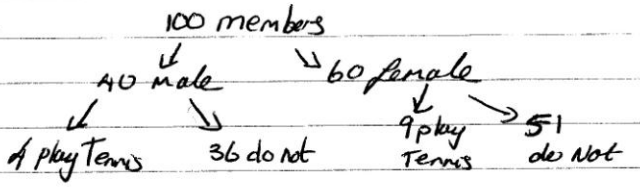
Q11 40 Red (→ even, → odd), 30 Blue, 30 green (20 even, 10 odd) Total = 100.

(i) $P(\text{Red}) = 40/100 = 2/5$

(ii) $P(\text{not Blue}) = \frac{70}{100} = 7/10$

(iii) $P(\text{G or even}) = \frac{30}{100} + \frac{60}{100} - \frac{20}{100} = \frac{70}{100} = 7/10$

Q12



(i) $P(\text{Male} + \text{Play T}) = \frac{4}{100} = 1/25$

(ii) $P(\text{play T}) = 13/100$

(iii) $P(\text{Female or play T}) = \frac{60}{100} + 13/100 - 9/100 = 64/100 = 16/25$

Q13 $A = \{20, 21, 22, 23\}$
$B = \{20, 25\}$
$C = \{23, 29\}$
$D = \{21, 27, 27,\}$

(i) (a) AB - No (b) AC - No (c) AD - No (d) BC - ½ (e) BD - ½

(ii) $P(\text{Prime or Mult of 3}) = 2/10 + 3/10 = 5/10 = 1/2$

(iii) No as events are Not Mutually exclusive.

Q14 Total = 20

(i) $P(A) = 8/20 = 2/5$

(ii) $P(B) = 11/20$

(iii) $P(A \cup B) = \frac{6+2+9}{20} = 17/20$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$17/20 = 8/20 + 11/20 - 2/20$

$17/20 = 17/20$ ✓ True.

Q15 (i) $P(C) = 0.4 + 0.2 = 0.6$

(ii) $P(D) = 0.2 + 0.3 = 0.5$

(iii) $P(C \cup D) = 0.4 + 0.2 + 0.3 = 0.9$

(iv) $P(C \cap D) = 0.2$

$P(C \cup D) = P(C) + P(D) - P(C \cap D)$

$0.9 = 0.6 + 0.5 - 0.2$

$0.9 = 0.9$ ✓ True.

Q16 (i) 50 students. $25 + 5 + x + 8 = 50$

$38 + x = 50$

$x = 12$

(ii) $P(F) = \frac{30}{50} = \frac{3}{5}$

(iii) $P(\text{Both F \& S}) = \frac{5}{50} = \frac{1}{10}$

(iv) $P(F \text{ or } S) = \frac{25 + 5 + 12}{50} = \frac{42}{50} = \frac{21}{25}$

(v) $P(\text{one Language only}) = \frac{25 + 12}{50} = \frac{37}{50}$.

Q17 (i) $5 + 3 + 2 + 1 + 11 + 8 + 7 + 3 = 40$

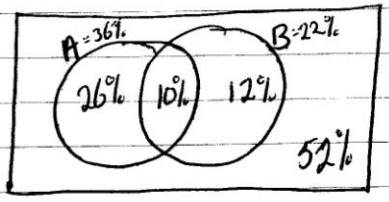
(ii) $P(\text{Both D + A}) = 3/40$

(iii) Does Drama = 11. $P(\text{Art}) = \frac{1+2}{11} = \frac{3}{11}$

(iv) Sport = 24 $P(\text{Drama}) = \frac{3+2}{24} = \frac{5}{24}$

(v) Both Drama + Art = 3 $P(\text{All 3}) = \frac{3}{3}$.

Q18 (i)



(ii) 52%

(iii) 26%

Q19 $P(A) = 2/3 \quad P(A \cup B) = 3/4 \quad P(A \cap B) = 5/12$

$$P(A \cup B) = P(A) + P(B) - P(A \cap B)$$
$$3/4 = 2/3 + P(B) - 5/12$$
$$\frac{9}{12} = \frac{8}{12} + P(B) - 5/12$$
$$\frac{9}{12} - \frac{8}{12} + 5/12 = P(B)$$
$$6/12 = P(B)$$
$$P(B) = 1/2$$

Q20 $P(X) = 1/2 \quad P(Y) = 3/5 \quad P(X \cup Y) = 9/10$.

$$P(X \cup Y) = P(X) + P(Y) - P(X \cap Y)$$
$$\frac{9}{10} = \frac{5}{10} + \frac{6}{10} - P(X \cap Y)$$
$$\frac{9}{10} = \frac{11}{10} - P(X \cap Y)$$
$$\Rightarrow P(X \cap Y) = 2/10 = 1/5$$

Q21 $P(C) = 0.7 \quad P(C \cup D) = 0.9 \quad P(C \cap D) = 0.3$

$$P(C \cup D) = P(C) + P(D) - P(C \cap D)$$
$$0.9 = 0.7 + P(D) - 0.3$$
$$0.9 - 0.7 + 0.3 = P(D)$$
$$0.5 = P(D)$$

Q22 $P(A) = 0.8 \quad P(B) = 0.5 \quad P(A \cap B) = 0.3$

(i) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A \cup B) = 0.8 + 0.5 - 0.3$

$P(A \cup B) = 1.$

(ii) $P(A \cup B) = 1$

$P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$1 = 0.8 + 0.5 - 0.3$

$1 = 1$ ✓ True.

Q23 $P(A) = 8/15, \quad P(B) = 2/3 = \frac{10}{15}, \quad P(A \cap B) = 1/3 = \frac{5}{15}$

(i) $P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$P(A \cup B) = 8/15 + 10/15 - 5/15$

$P(A \cup B) = 13/15$

(ii) No Because $(A \cap B)$ exists $= 1/3$

Q24 $P(A) = 3/7 \quad P(B) = 1/5$ Mutually Exclusive $\Rightarrow (A \cap B) = \phi$

$P(A \cup B) = 3/7 + 1/5$

$= \frac{15}{35} + \frac{7}{35} = 22/35.$