

6 PROBABILITY TEST SOLUTIONS

① (i) $10 \times 10 \times 10 \times 10 \times 10 = 100000$ (5)

(ii) $1 \times 10 \times 10 \times 10 \times 5 = 5000$ (5)

② (i) $\binom{9}{5} = 126$ (5)

(ii) $\binom{7}{4} = 35$ (5)

③ Work out total no. of arrangements

$$= 7! = 5040 \quad 5$$

Work out no. of arrangements with A beside R

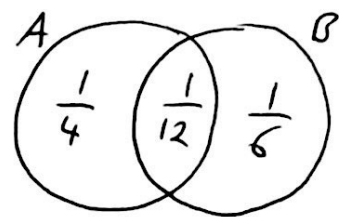
$$= 6! \times 2 = 1440 \quad 5$$

$$\therefore \text{No. with A not beside R} = 5040 - 1440 = 3600 \quad 5$$

④ (i) $P(A \cap B) = P(A) + P(B) - P(A \cup B)$

$$= \frac{1}{3} + \frac{1}{4} - \frac{1}{2}$$

$$= \frac{1}{12}$$



(ii) $P(A|B) = \frac{P(A \cap B)}{P(B)}$

$$= \frac{\frac{1}{12}}{\frac{1}{4}} = \frac{1}{3} \quad 5$$

(iii) $P(B|A) = \frac{P(B \cap A)}{P(A)} = \frac{\frac{1}{12}}{\frac{1}{3}} = \frac{1}{4} \quad 5$

(iv) Yes. $P(A|B) = P(A)$ 5

(v) No. $P(A \cap B) = \frac{1}{12}$ 5

5 (i) Bernoulli Trial

success = odd $\Rightarrow P(\text{success}) = \frac{5}{9}$

$\left(\frac{5}{9}\right)\left(\frac{5}{9}\right)\left(\frac{5}{9}\right) = \boxed{\frac{125}{729}}$ 5

(ii) $\binom{3}{2}\left(\frac{5}{9}\right)^2\left(\frac{4}{9}\right)^1 = \boxed{\frac{100}{243}}$ 5

(iii) 1st odd, sum even
 \Rightarrow 2nd odd & 3rd even or 2nd even & 3rd odd

$= \left(\frac{5}{9}\right)\left(\frac{4}{9}\right) + \left(\frac{4}{9}\right)\left(\frac{5}{9}\right) = \boxed{\frac{40}{81}}$ 5

6

winnings = x	1	2	-5
$P(x)$	$\frac{2}{4}$	$\frac{1}{4}$	$\frac{1}{4}$
$x \cdot P(x)$	$\frac{2}{4}$	$\frac{2}{4}$	$-\frac{5}{4}$

5

HH
HT
TH
TT

$E(x) = \frac{2}{4} + \frac{2}{4} - \frac{5}{4} = -\frac{1}{4}$

\therefore Not fair game.

$$\textcircled{7} \quad P(1M \& 1W) = \frac{\binom{4}{1} \times \binom{8}{1}}{\binom{12}{2}} = \boxed{\frac{16}{33}} \quad 10$$

$$\textcircled{8} \quad (i) \quad P(r, r) = \frac{5}{8} \times \frac{2}{8} = \frac{10}{64} = \boxed{\frac{5}{32}} \quad 5$$

$$(ii) \quad P(r, r \text{ or } w, w) = \frac{5}{32} + \binom{3}{8} \binom{6}{8} \\ = \boxed{\frac{7}{16}} \quad 10$$

$$(iii) \quad P(\text{at least 1 red}) \\ = 1 - P(\text{no red}) \\ = 1 - \binom{3}{8} \binom{6}{8} \\ = \boxed{\frac{23}{32}} \quad 10$$

