Chapter 16 Solution

Exercise 71

1. (a) The number of different words

$= 5!$ (A1) for correct factorial

$= 120$ A1

[2]

(b) The number of different words

$= 2! \times 4!$ (A2) for correct factorials

$= 48$ A1

[3]

(c) The number of different words

$= 3 \times 4!$ (A2) for correct factorial

$= 72$ A1

[3]

2. (a) The number of different arrangements

$= 2! \times 7!$ (A2) for correct factorials

$= 10080$ A1

[3]

(b) The number of different arrangements

$= 8! - 10080$ (A1) for correct formula

$= 30240$ A1

[2]

(c) The number of different arrangements

$= 2! \times 6! \times 2$ (A2) for correct factorials

$= 2880$ A1

[3]

3. (a) The total number of possible ways

$= \frac{8!}{8}$ (A1) for correct factorial

$= 5040$ A1

[2]

(b) The total number of possible ways

$= \frac{2! \times 6!}{8}$ (A2) for correct factorials

$= 180$ A1

[3]

4. (a) The total number of possible ways

$= \dfrac{10!}{10 \times 2}$ (A2) for correct formula

$= 181440$ A1

[3]

(b) The number of possible ways

$= 181440 - \dfrac{2! \times 9!}{9 \times 2}$ (A2) for correct formula

$= 141120$ A1

[3]

Exercise 72

1. (a) The number of possible teams

$= \binom{10}{4}$ (M1) for valid approach

$= 210$ A1

[2]

(b) The number of teams

$= \binom{5}{1} \times \binom{5}{3}$ M1

$= 50$ A1

[2]

(c) The number of teams

$= \binom{5}{4} \times \binom{5}{0} + \binom{5}{3} \times \binom{5}{1} + \binom{5}{2} \times \binom{5}{2}$ M1

$= 155$ A1

[2]

2. (a) The number of possible teams

$= \binom{16}{6}$ (M1) for valid approach

$= 8008$ A1

[2]

(b) The number of teams

$= \binom{9}{4} \times \binom{7}{2}$ M1

$= 2646$ A1

[2]

(c) The number of teams

$= \binom{9}{1} \times \binom{7}{5} + \binom{9}{3} \times \binom{7}{3} + \binom{9}{5} \times \binom{7}{1}$ M1

$= 4011$ A1

[2]

3. (a) The number of queues

$= 5! \times 7! \times 2$ M1A1

$= 1209600$ A1

[3]

(b) The number of possible selections

$= \binom{5}{0} \times \binom{7}{6} + \binom{5}{1} \times \binom{7}{5}$ M1

$= 112$ A1

[2]

4. (a) $\binom{10}{4} \times \binom{6}{r} \times \binom{6-r}{6-r} = 1260$ M1A1

$\binom{6}{r} = 6$ (A1) for simplification

$\binom{6}{r} = \binom{6}{1}$ or $\binom{6}{r} = \binom{6}{5}$

$r = 1$ or $r = 5$ A2

[5]

(b) 1 A1

[1]