

REV-PROB-2223-ASM-SET 2-MATH**Suggested solutions****Conventional Questions**

1. (a) Number of ways = $7!$
 $= 5040$ 1A
- (b) Required probability = $\frac{6!2!}{7!}$ 1M
 $= \frac{2}{7}$ 1A
- (c) Required probability = $\frac{4!2!2!2!}{7!}$ 1M
 $= \frac{4}{105}$ 1A

2. (a) Required probability = $\frac{C_5^6}{C_5^8}$ 2M
 $= \frac{3}{28}$ 1A
- (b) Required probability = $\frac{C_1^2 C_4^6}{C_5^8}$ 2M
 $= \frac{15}{28}$ 1A

3. (a) Required probability = $\frac{C_2^{12} C_3^8}{C_5^{12+8}}$
 $= \frac{77}{323}$ 1A
- (b) Required probability = $\frac{C_3^{12} C_3^8 + C_2^{12} C_4^8 + C_1^{12} C_5^8 + C_6^8}{C_6^{20}}$ 1M
 $= \frac{147}{323}$ 1A

4. (a) Required probability = $\frac{C_3^5 + C_3^7}{C_3^{12}}$ 1M
 $= \frac{9}{44}$ 1A
- (b) Required probability = $\frac{(C_2^5 2!) C_1^7 + (C_2^7 2!) C_1^5}{C_3^{12} 3!}$ 1M
 $= \frac{35}{132}$ 1A

5. (a) Required probability = $\frac{C_5^{10}}{C_5^{16}}$ 1M
 $= \frac{3}{52}$ 1A
- (b) Required probability = $1 - \frac{C_5^{10} + C_4^{10}C_1^6}{C_5^{16}}$ 1M
 $= \frac{17}{26}$ 1A
6. (a) There are altogether 15 students.
Number of ways = $C_3^{15}C_4^{12}C_8^8$ 1M+1A
 $= 225\ 225$ 1A
- (b) (i) Required probability = $\frac{C_0^{12}C_4^{12}C_8^8 + C_3^{12}C_1^9C_8^8 + C_3^{12}C_4^9C_5^5}{225\ 225}$ 1M
 $= \frac{61}{455}$ 1A
- (ii) Required probability = $1 - \frac{61}{455}$ 1M
 $= \frac{394}{455}$ 1A
7. (a) Required probability = $\frac{1}{2}$ 1A
- (b) Required probability = $1 - \left(\frac{1}{2} \times \frac{1}{2}\right)$ 1M
 $= \frac{3}{4}$ 1A
8. (a) Required probability = $\frac{C_3^8C_1^4}{C_4^{12}}$ 1M
 $= \frac{224}{495}$ 1A
- (b) Required probability = $\frac{C_4^8}{C_4^{12}} + \frac{224}{495}$ 1M
 $= \frac{98}{165}$ 1A
9. (a) Required probability = $\frac{5!7!}{11!}$ 1M
 $= \frac{1}{66}$ 1A
- (b) Required probability = $\frac{2!7!4!}{11!}$ 1M
 $= \frac{1}{165}$ 1A

10. (a) Number of ways = $C_2^6 = 15$ 1A
- (b) Required probability = $1 - \frac{15}{C_4^{12}}$ 1M
- $$= \frac{32}{33}$$
- 1A
11. (a) Required probability = $\frac{2+2}{4 \times 4}$ 1M
- $$= \frac{1}{4}$$
- 1A
- (b) Required probability = $\frac{3+3}{4 \times 4}$ 1M
- $$= \frac{3}{8}$$
- 1A
- (c) Required probability = $1 - \left(\frac{3}{4}\right)\left(\frac{3}{4}\right)$ 1M
- $$= \frac{7}{16}$$
- 1A
12. Required probability = $\frac{C_4^6 4! 5!}{9!}$ 1M+1M
- $$= \frac{5}{42}$$
- 1A
13. (a) Required probability = $\frac{C_2^2 \times C_2^4 + C_2^4 \times C_2^2}{C_2^7 \times C_2^8}$ 1M+1A
- $$= \frac{1}{49}$$
- 1A
- (b) Required probability = $\frac{C_2^4 \times C_1^2 \times C_1^6 + C_1^4 \times C_1^3 \times C_2^2}{C_2^7 \times C_2^8}$ 1M+1A
- $$= \frac{1}{7}$$
- 1A
14. (a) Required probability = $\frac{C_5^7 + C_5^5}{C_5^{15}}$ 1M
- $$= \frac{2}{273}$$
- 1A
- (b) Required value
- $$= 100 \times \frac{2}{273} + 50 \times \frac{C_4^7 C_1^8 + C_4^5 C_1^{10}}{C_5^{15}} + 10 \times \left(1 - \frac{2}{273} - \frac{C_4^7 C_1^8 + C_4^5 C_1^{10}}{C_5^{15}}\right)$$
- 1M+1A
- $$= \$ \frac{1370}{91}$$
- 1A