

Unit 3 *Extending Probability*

Text Answers

3.1 Multiplication for Independent Events

1. NI - not independent I - independent (a) NI (b) I (c) I
(d) NI (e) NI (f) NI
2. (a) (i) $\frac{5}{8}$ (ii) $\frac{3}{8}$ (iii) $\frac{25}{64}$ (iv) $\frac{9}{64}$ (v) $\frac{15}{64}$ (vi) $\frac{15}{64}$
(b) (i) $\frac{9}{64}$ (ii) $\frac{15}{32}$ (iii) $\frac{17}{32}$
3. (a) (i) $\frac{7}{10}$ (ii) $\frac{3}{10}$ (iii) $\frac{9}{100}$ (iv) $\frac{49}{100}$ (v) $\frac{21}{100}$
(vi) $\frac{21}{100}$ (b) (i) $\frac{49}{100}$ (ii) $\frac{21}{50}$ (iii) $\frac{29}{50}$
4. (a) $\frac{1}{4}$ (b) $\frac{1}{36}$
5. (a) 0.06 (b) No
6. (a) 0.72 (b) 0.02 (c) 0.08
7. (a) 0.1 (b) 0.4 (c) 0.4 (d) 0.1
8. (a) 0.42 (b) 0.16
9. (a) $\frac{1}{49}$ (b) $\frac{36}{49}$ (c) $\frac{12}{49}$ (d) $\frac{1}{343}$
10. (a) No (b) $\frac{171}{250}$ (c) $\frac{283}{1000}$
11. (a) 0.003 (b) 0.833
12. (a) $\frac{1}{25}$ (b) $\frac{8}{25}$
13. (a) 0.58 (b) 0.44
14. 0.04

3.2 Mutually Exclusive Events

1. B ; C
2. (a) Yes (b) No (c) No (d) Yes (e) No
3. 0.3
4. $\frac{1}{6}$
5. (a) $\frac{3}{7}$ (b) 12 (c) 14

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6. (a) $\frac{7}{20}$ (b) Not mutually exclusive
7. (a) $\frac{2}{3}$ (b) $\frac{11}{15}$ (c) $\frac{3}{5}$ (d) $\frac{3}{5}$
8. (a) $\frac{5}{8}$ (b) $\frac{11}{20}$ (c) $\frac{7}{40}$
9. (a) 0.1 (b) 0.7
10. Pink : $\frac{2}{5}$ Yellow : $\frac{2}{7}$ Black : $\frac{11}{35}$
11. (a) $\frac{12}{25}$ (b) $\frac{22}{25}$ (c) Yes $\left(\frac{8}{25} \times \frac{3}{25} = \frac{24}{625}\right)$ (d) No (e) No : $\frac{13}{25}$
12. (a) 0.2 (b) 0.7 (c) 20
13. (a) 0.7 (b) 0.7 (c) 0.6 (d) not mutually exclusive
14. (a) (i) 0.25 (ii) 0.75 (b) (i) 0.4 (ii) not mutually exclusive

3.3 Tree Diagrams and Conditional Probability

1. (a) $\frac{1}{7}$ (b) $\frac{3}{7}$ (c) $\frac{4}{7}$
2. (a) (i) $\frac{1}{17}$ (ii) $\frac{13}{34}$ (iii) $\frac{19}{34}$ (b) (i) $\frac{1}{221}$ (ii) $\frac{188}{221}$ (iii) $\frac{32}{221}$
3. $\frac{43}{91}$
4. (a) 0.24 (b) 0.09
5. (a) (i) 0.36 (ii) 0.36 (iii) 0.28 (b) 0.81
6. (a) $\frac{1}{12}$ (b) $\frac{1}{4}$ (c) $\frac{3}{4}$
7. (a) $\frac{11}{46}$ (b) $\frac{7}{69}$ (c) $\frac{1}{46}$ (d) $\frac{25}{69}$ (e) $\frac{8}{69}$
8. (a) $\frac{585}{812}$ (b) $\frac{801}{4060}$ (c) $\frac{34}{203}$
9. (a) 0.52 (b) 0.53 to 1 d.p.
10. (a) (i) $\frac{1}{4}$ (ii) $\frac{1}{2}$ (iii) $\frac{1}{6}$ (b) $\frac{47}{108}$
11. (b) 0.15
12. (b) 0.42 (c) 0.1638

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13. (a) $\frac{7}{75}$ (b) $\frac{3}{76}$ (c) $\frac{7}{15}$
14. (b) 0.384 (c) 0.388
15. (a) $\frac{7}{11}$ (c) PP, CPP, PCP (d) $\frac{126}{165} \approx 0.764$

3.4 Using Venn Diagrams to Find Probabilities

1. (i) (a) $\frac{7}{20}$ (b) $\frac{4}{20}$ (c) 1 (d) $\frac{9}{20}$
- (ii) (a) $\frac{4}{17}$ (b) $\frac{6}{17}$ (c) 1 (d) $\frac{7}{17}$
- (iii) (a) 0 (b) $\frac{1}{5}$ (c) $\frac{9}{10}$ (d) $\frac{7}{10}$
- (iv) (a) $\frac{1}{8}$ (b) $\frac{2}{5}$ (c) $\frac{3}{4}$ (d) $\frac{9}{40}$
2. (a) $\frac{1}{26}$ (b) $\frac{7}{13}$ (c) $\frac{6}{13}$
3. (a) 0.4 (b) 0 (c) 0.4
4. (a) $\frac{5}{6}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) $\frac{1}{6}$
5. (a) $\frac{2}{5}$ (b) $\frac{1}{6}$ (c) $\frac{1}{2}$
6. (i) (a) $\frac{3}{40}$ (b) $\frac{29}{40}$ (c) $\frac{21}{40}$
- (d) $\frac{1}{8}$ (e) $\frac{3}{5}$ (f) $\frac{1}{4}$
- (ii) (a) $\frac{1}{12}$ (b) $\frac{47}{60}$ (c) $\frac{7}{12}$
- (d) $\frac{7}{60}$ (e) $\frac{13}{20}$ (f) $\frac{11}{30}$
- (iii) (a) 0 (b) $\frac{4}{5}$ (c) $\frac{31}{50}$
- (d) $\frac{7}{50}$ (e) $\frac{16}{25}$ (f) $\frac{11}{50}$
- (iv) (a) 0 (b) $\frac{9}{10}$ (c) $\frac{23}{50}$
- (d) $\frac{1}{5}$ (e) $\frac{2}{3}$ (f) $\frac{13}{30}$
7. 0.57816