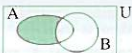
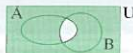


6. (a) i.  ii.  (b) i.  $A \cap B'$  ii.  $(A \cap B)' \cup (A \cap B)$

7. (a)  $p$  is not a sufficient condition for  $q$ . (b)  $q$  is a sufficient condition for  $p$  (c)  $q \Rightarrow p$

## ANSWERS TO CHAPTER 15

### EXERCISE 15.1

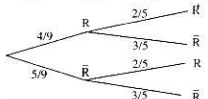
1. (a)  $\frac{2}{5}$  (b)  $\frac{3}{5}$  (c)  $\frac{2}{5}$  2. (a)  $\frac{2}{7}$  (b)  $\frac{5}{7}$  3. (a)  $\frac{5}{26}$  (b)  $\frac{21}{26}$  4. {HH, HT, TH, TT} (a)  $\frac{1}{4}$  (b)  $\frac{3}{4}$
5. {HHH, HHT, HTH, THH, TTT, TTH, THT, HTT} (a)  $\frac{3}{8}$  (b)  $\frac{1}{2}$  (c)  $\frac{1}{4}$  6. (a)  $\frac{2}{9}$  (b)  $\frac{2}{9}$  (c)  $\frac{2}{3}$  (d)  $\frac{1}{3}$
7. (a)  $\frac{1}{2}$  (b)  $\frac{3}{10}$  (c)  $\frac{9}{20}$  8. (a)  $\frac{11}{36}$  (b)  $\frac{1}{18}$  (c)  $\frac{1}{6}$  (d)  $\frac{5}{36}$  9. {GGG, GGB, GBG, BGG, BBB, BBG, BGB, GBB} (a)  $\frac{1}{8}$  (b)  $\frac{3}{8}$  (c)  $\frac{1}{2}$  10. (a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$  (c)  $\frac{1}{4}$  11. (a)  $\frac{3}{8}$  (b)  $\frac{1}{4}$  (c)  $\frac{3}{8}$  (d)  $\frac{3}{4}$
12. (a) {(1, H), (2, H), (3, H), (4, H), (5, H), (6, H), (1, T), (2, T), (3, T), (4, T), (5, T), (6, T)} (b)  $\frac{1}{4}$  13. (a)  $\frac{1}{216}$  (b)  $\frac{1}{8}$  (c)  $\frac{3}{8}$

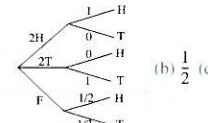
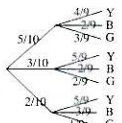
### EXERCISE 15.2

1. (a)  $\frac{1}{4}$  (b)  $\frac{5}{8}$  (c)  $\frac{3}{4}$  2. (a)  $\frac{1}{13}$  (b)  $\frac{1}{2}$  (c)  $\frac{1}{26}$  (d)  $\frac{7}{13}$  3.  $\frac{9}{26}$  4. (a) 1.0 (b) 0.3 (c) 0.5 5. (a) 0.65 (b) 0.70 (c) 0.65 6. (a) 0.95 (b) 0.05 (c) 0.80 7. (a) {TTT, TTH, THT, HTT, HHH, HHT, HTH, THH} (b)  $\frac{3}{8}$  (c)  $\frac{1}{2}$  (d)  $\frac{1}{4}$  (e)  $\frac{3}{8}$  8. (a)  $\frac{6}{25}$  (b)  $\frac{6}{25}$  (c)  $\frac{13}{25}$  9. (a)  $\frac{3}{4}$  (c)  $\frac{1}{2}$  (d)  $\frac{1}{6}$  (e)  $\frac{7}{12}$
10. (a)  $\frac{1}{4}$  (b)  $\frac{1}{2}$  (c)  $\frac{8}{13}$  (d)  $\frac{7}{13}$  11. (a) 0.1399 (b) 0.8797 (c) 0.6 12. (b)  $\frac{4}{15}$  (c)  $\frac{4}{15}$  (d)  $\frac{11}{15}$

### EXERCISE 15.3

1. (a) 0.7 (b) 0.75 (c) 0.50 (d) 0.5 2. (a) 0.5 (b) 0.83 (c) 0.10 (d) 0.90

3. (a)  (b)  $\frac{8}{45}$  (c)  $\frac{22}{45}$  (d)  $\frac{6}{11}$  4. (a) 0.5 (b) 0.30 (c) 0.25

5. (a)  (b)  $\frac{1}{2}$  (c)  $\frac{2}{3}$  6.  $\frac{1}{3}$  7. (a)  (b)  $\frac{31}{45}$  (c)  $\frac{2}{9}$  8.  $\frac{2}{3}$

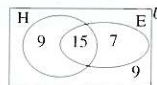
9. (a) 0.88 (b) 0.42 (c) 0.6 (d) 0.28 10. (a) 0.33 (b) 0.27 (c) 0.82 (d) 0.551 11. (a) 0.22 (b) 0.985 (c) 0.8629 12. (a) 0.44 (b) 0.733 14. (a) 0.512 (b) 0.128 (c) 0.8571 15. (a) 0.2625 (b) 0.75

- (c) 0.4875 (d) 0.7123 16. (a) 0.027 (b) 0.441 (c) 0.453

### CHAPTER 15 - MISCELLANEOUS EXERCISES

1. (a) 0.16 (b) 0.70 (c) 0.58 2. (a) 0.5 (b) 0.7 (c) 0.4 (d) 0.1 3. (a) (b) (i) 0.375 (ii) 0.225 (iii) 0.4 (iv) 0.225 4. (a) 0.343 (b) 0.147 (c) 0.8125

5. (i) Use of diagram (e.g. Venn), 19 (ii)  $\frac{11}{70}$  (iii)  $\frac{19}{36}$  (iv) Dependent.



6. (i)  $\frac{1}{9}$  (ii)  $\frac{4}{9}$  (iii)  $\frac{2}{3}$

8. i. 

Number of eggs	2	3	4	5	6	7	8	9	10	11
Frequency	5	1	5	8	3	4	2	6	2	4

  
 ii.  $\frac{3}{20}$  iii. 6,325 eggs per bird iv.  $\frac{9}{20}$  v. 2,787 eggs vi. The interval is 3.5376 to 9.11236 or in whole numbers 4 to 9. vii.  $\frac{7}{10}$

2. i. Each spin is physically separate from the others. The result of the first spin will not affect the second.

ii.

Heads	Probability
0	0.064
1	0.288
2	0.432
3	0.216

iii. 0.36

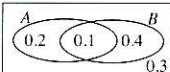
iv. 0.00241865

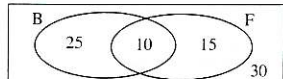
### CHAPTER 15 - GRADED REVISION EXERCISES

#### LEVEL 1

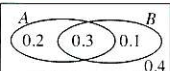
1.  $\frac{1}{26}$  2.  $\frac{4}{9}$  3.  $\frac{1}{8}$  4.  $\frac{2}{6} = \frac{1}{3}$  5.  $\frac{1}{4}$  6.  $\frac{1}{2}$

#### LEVEL 2

1.  i. 0.7 ii. 0.5 iii. 0.4
2. i. 16 ii.  $\frac{1}{16}$  iii.  $\frac{3}{8}$  iv.  $\frac{5}{16}$  3. i.  $\frac{1}{81}$  ii.  $\frac{1}{72}$

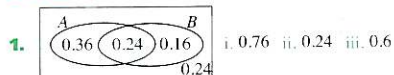
4. i.  ii.  $\frac{1}{8}$  iii.  $\frac{5}{16}$  iv.  $\frac{3}{8}$

#### LEVEL 3

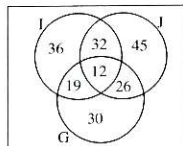
1.  i.  $\frac{3}{4}$  ii.  $\frac{3}{5}$  iii. 0.2, 0.3 so the events are not independent.

2. i.  $\frac{4}{51}$  ii. No iii.  $\frac{1}{13}$  3. (a) i. Yes ii.  $\frac{3}{28}$  iii.  $\frac{3}{14}$  (b) i. No ii.  $\frac{3}{32}$  iii.  $\frac{3}{16}$

#### LEVEL 4

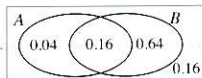


2. i. ii.  $\frac{3}{50}$  iii.  $\frac{77}{200}$  iv.  $\frac{44}{115}$



v. No, selections made without replacement are always dependent.

#### CHAPTER 15 - TOPIC TEST

1. i. 0.2 ii. 0.4 2. i. 0.25 ii.  $\frac{3}{51}$  iii.  $\frac{25}{51}$  3. i.  ii. 0.84 iii. 0.16

- iv.  $\frac{1}{5}$  4. i.  $\frac{3}{7}$  (the results are independent) ii.  $\frac{864}{2401}$  iii.  $\frac{9}{49}$

## ANSWERS TO CHAPTER 16

#### EXERCISE 16.1

1.	a cm	b cm	c cm	A	B	C
1	3.8	4.1	1.6	67°	90°	23°
2	81.5	98.3	55.0	56°	90°	34°
3	32.7	47.1	33.9	44°	90°	46°
4	1.61	30.7	30.7	3°	90°	87°
5	2.3	2.74	1.49	57°	90°	33°
6	48.5	77	59.8	39°	90°	51°
7	44.4	81.6	68.4	33°	90°	57°
8	2.93	13.0	12.7	13°	90°	77°
9	74.4	94.4	58.1	52°	90°	38°
10	71.8	96.5	64.6	48°	90°	42°
11	23.3	34.1	24.9	43°	90°	47°
12	43.1	43.2	2.3	87°	90°	3°
13	71.5	80.2	36.4	63°	90°	27°
14	33.5	34.1	6.5	79°	90°	11°
15	6.1	7.2	3.82	58°	90°	32°
16	29.1	30	7.3	76°	90°	14°
17	29.0	29.1	2.0	86°	90°	4°
18	34.5	88.2	81.2	23°	90°	67°
19	24.0	29.7	17.5	54°	90°	36°
20	41.2	46.2	21.0	63°	90°	27°

21	59.6	72.9	41.8	55°	90°	35°
22	5.43	6.8	4.09	53°	90°	37°
23	13.0	19.8	14.9	41°	90°	49°
24	14.0	21.3	16.1	41°	90°	49°
25	82.4	88.9	33.3	68°	90°	22°

2. (a)  $2\sqrt{3}$  (b)  $5(1 + \sqrt{3})$  (c) 4 (d)  $2(1 + \sqrt{3})$  (e)  $\frac{4}{3}(3 + \sqrt{3})$  (f)  $\sqrt{106} - 5$  4. (a)  $25(1 + \sqrt{3})$   
(b)  $\frac{40\sqrt{3}}{3}$

#### EXERCISE 16.2

1. (a) i. 030°T ii. 330°T iii. 195°T iv. 200°T (b) i. N25°E ii. S iii. S40°W iv. N10°W  
2. 37.49m 3. 18.94m 4. 37° 18' 5.  $\frac{26}{9}$  m/s 6. N58° 33'W, 37.23 km 7. 139.78 m 8. 10.58 m  
9. 72.25 m 10. 25.39 km 11. 15.76 m 12. (a) 3.01km N, 3.99km E (b) 2.87km E 0.88km S  
(c) 6.86km E 2.13km N (d) 7.19km 253°T 13. 524m

#### EXERCISE 16.3

1. (a) 39°48' (b) 64°46' 2. (a) 12.81 cm (b) 61.35 cm (c) 77°57' (d) 60.83 cm (e) 80° 32'  
3. (a) 21°48' (b) 42°2' (c) 26°34' 4. (a) 2274 (b) 12.7° 5. 251.29 m 6. (a) 103.5 m (b) 35.3'  
(c) 39.2° 7. (b) 53.43 (c) 155.16 m (d) 145.68 m 8. (b) 48.54 m 9. (a)  $\sqrt{(b-c)^2 + h^2}$   
(b)  $\tan^{-1}\left(\frac{h}{a}\right)$  (c)  $\tan^{-1}\left(\frac{h}{b-c}\right)$  (d)  $2(b+c)\sqrt{h^2+a^2} + 2a\sqrt{(b-c)^2+h^2}$  10. 82.80 m  
11. (a) 40.61 m (b) 49.46 m 12. (a) 10.61 cm (b) 75° 58' (c) 93° 22' 13. (a) 1.44 m (b) 73° 13'  
(c) 62° 11'

#### EXERCISE 16.4

1. (a) 1999.2 cm<sup>2</sup> (b) 756.8 cm<sup>2</sup> (c) 3854.8 cm<sup>2</sup> (d) 2704.9 cm<sup>2</sup> (e) 538.0 cm<sup>2</sup> (f) 417.5 cm<sup>2</sup>  
(g) 549.4 cm<sup>2</sup> (h) 14.2 cm<sup>2</sup> (i) 516.2 cm<sup>2</sup> (j) 281.5 cm<sup>2</sup> (k) 918.8 cm<sup>2</sup> (l) 387.2 cm<sup>2</sup>  
(m) 139.0 cm<sup>2</sup> (n) 853.7 cm<sup>2</sup> (o) 314.6 cm<sup>2</sup> 2. 69345 m<sup>2</sup> 3.  $100\pi - 6\sqrt{91}$  cm<sup>2</sup> 4. 17.34 cm  
5. (a) 36.77sq units (b) 14.70 sq units (c) 62.53 sq units 6. 52.16 cm<sup>2</sup> 7. 27° 2'  
8.  $\frac{(b+a \times \tan \theta)^2}{2 \tan \theta}$  9. 101.78 cm<sup>2</sup>

#### EXERCISE 16.5.1

1	a cm	b cm	c cm	A	B	C
1	13.3	37.1	48.2	10°	29°	141°
2	2.7	1.2	2.8	74°	25°	81°
3	11.0	0.7	11.3	60°	3°	117°
4	31.9	39.1	51.7	38°	49°	93°
5	18.5	11.4	19.5	68°	35°	77°
6	14.6	15.0	5.3	75°	84°	21°
7	26.0	7.3	26.4	79°	16°	85°
8	21.6	10.1	28.5	39°	17°	124°
9	0.8	0.2	0.8	82°	16°	82°
10	27.7	7.4	33.3	36°	9°	135°
11	16.4	20.7	14.5	52°	84°	44°
12	21.4	45.6	64.3	11°	24°	145°