

ANSWERS

Chapter 9 Number Patterns

Try It!

1. (a) 18, 22 (b) -17, -23
2. (a) 162, 486 (b) 16, -6.4

3. (a)

n	1	2	3	4
T_n	3	5	7	9
P_n	9	12	15	18

- (b) $T_5 = 11, P_5 = 21$
4. $T_2 = 10, T_9 = 108$
5. (a) $T_n = 1 + 3n$ (b) $T_{15} = 46$
6. (a) $T_n = 4n - 3$ (b) $T_{18} = 69$

Exercise 9.1

1. (a) 19, 21 (b) 13, 16
(c) 0, -4 (d) 5, -6
2. (a) 16, 32 (b) $\frac{3}{5}, \frac{3}{25}$
(c) 1, -1 (d) -324, 972
3. (a) 125, 216 (b) 15, 21
(c) $\frac{1}{16}, \frac{1}{32}$ (d) $\frac{5}{6}, \frac{6}{7}$
4. (a) 14 (b) 5
(c) 320 (d) $\frac{512}{27}$
5. (a) 2, 8, 18, 32 (b) 128
6. (a) 2, 6, 12, 20 (b) 110
7. (b) $T_1 = 4, T_2 = 6, T_3 = 8, T_4 = 10, T_5 = 12$
(c) $P_1 = 20$ cm, $P_2 = 24$ cm, $P_3 = 28$ cm, $P_4 = 32$ cm, $P_5 = 36$ cm
8. (a) $T_1 = 5, T_2 = 9, T_3 = 13, T_4 = 17, T_5 = 21$
(b) $T_8 = 33$
(c) $P_1 = 15$ cm, $P_2 = 24$ cm, $P_3 = 33$ cm, $P_4 = 42$ cm, $P_5 = 51$ cm
(d) $P_8 = 78$ cm
9. 144
10. (a) Sum of previous two terms
(b) 21, 34, 55
(c) 1, 2, 3, 5, 8

Exercise 9.2

1. (a) 3, 5, 7 (b) 4, 1, -2
(c) 0, 2, 8 (d) $\frac{1}{3}, \frac{1}{2}, \frac{3}{5}$
2. 154 3. 342
4. 32 5. 85
6. (a) $T_n = 41 - 2n$ (b) 5
7. (a) $a_n = n(n + 3)$ (b) $T_n = n^2 + 3n$
(c) Yes
8. (a) 2, 3, 4 (b) 5^2 (c) n^2

9. (a)

n	Number of dots	Total number
1	1	1×2
2	$1 + 2$	2×3
3	$1 + 2 + 3$	3×4
4	$1 + 2 + 3 + 4$	4×5
5	$1 + 2 + 3 + 4 + 5$	5×6

- (b) 1 : 2 (c) $\frac{n(n+1)}{2}$ (e) 18,825
10. (a) $P_1 = 12, P_2 = 20, P_3 = 28$
(b) $P_n = 2(2 + 4n)$
(c) 124 cm
11. (a) (i) 16 (ii) n^2
(b) (i) 20 (ii) $4 + 4n$

12. (b)

n	Number of carbon atoms	Number of hydrogen atoms
1	2	4
2	3	6
3	4	8
4	5	10

- (c) $C_{n+1}H_{2n+2}$
13. (b)
- | n | 1 | 2 | 3 | 4 | 5 |
|-------|---|---|---|---|----|
| T_n | 0 | 1 | 3 | 6 | 10 |
- (c) $T_6 = 15, T_7 = 21$
14. (b) Increase 1 block every time
(c) $T_n = n$
15. 16

Review Exercise 9

1. (a) 33, 35 (b) 17, 11
(c) 256, 1,024 (d) 80, -160
2. $T_3 = 15, T_{20} = 440$
3. $\frac{71}{105}$
4. (a) $T_n = n + 1$ (b) $T_n = 2 \times 3^{n-1}$
(c) $T_n = \frac{n}{n+3}$ (d) $T_n = n(n + 1)$
5. (b)
- | n | 1 | 2 | 3 | 4 |
|-------|---|---|---|----|
| G_n | 7 | 8 | 9 | 10 |
| W_n | 2 | 4 | 6 | 8 |
- (c) $G_n = 6 + n$ (d) $W_n = 2n$

6. (a)

n	1	2	3	4
T_n	4	12	24	40

(b) $T_n = 2n(n+1)$ (c) 220

7. (b)

n	1	2	3	4
T_n	1	4	9	16
P_n	7	14	21	28

(c) $T_n = n^2$

(d) $P_n = 7n$

Chapter 10 Coordinates and Linear Graphs

Try it!

- (a) $P(3, 1), Q(-2, -1)$
(b) P : first quadrant, Q : third quadrant
- (b) No
(c) $y = 0.5$
- (b) $t = 5$
- Slope $PQ = 0$, Slope $PR = 1$, Slope $QR = -\frac{3}{2}$
- (b) (i) -2 (ii) -2
(iii) -2 (iv) -2

Exercise 10.1

- (a) $A(3, 0), B(5, 2), C(2, 4), D(0, 2), E(-4, 3), F(-5, -3), G(-2, -4), H(0, -1), I(1, -3), J(4, -2)$
(b) B, C
(c) I, J
(d) D, H
- (a) 3 (b) -2 (c) -1 (d) 0
- (a) -5 (b) 2 (c) 7 (d) 0
- (b) $C(-3, 3)$
(c) $m\angle AOB = 45^\circ, m\angle BOC = 45^\circ$
(d) Equal in length, i.e., $OA = OC$, Symmetric about y -axis, OA is perpendicular to OC
- (b) fourth quadrant (c) third quadrant
(d) $m\angle POQ = 90^\circ$ (e) $R(-4, 2)$
- (b) 5 units² (c) $M(-2.5, 1)$
(d) $MO = MS = MT$
- (b) C and D
(c) (i) Positive
(ii) Negative
- (a) Square 1: 2 units²
Square 2: 8 units²
Square 3: 18 units²
(b) Square 10: 200 units²
(c) area of Square n : $2n^2$ units²

Exercise 10.2

- (a) $-5, -2, 0, 2$
- (a) 5, 1, $-1, -5$
- (b) No
- (b) Yes (c) $x = 3$
- (b) (1, 0)
- (b) x -axis: $(-2, 0)$, y -axis: $(0, 0.5)$

- (b) (1, 2), (3, 2), (1, -3), (3, -3)
(c) 10 units²
- (b) All the lines cut through (0, 1).
(c) They all have 1 as the constant term.
- (b) They are parallel.
(c) The coefficient of x of each equation is -1 .
- (b) $a = 4, b = 9, c = 2\frac{1}{3}$
- (b) 4 minutes
- (b) 2.5 hours

Exercise 10.3

- Slope $L_1 = 1$, Slope $L_2 = 3$, Slope $L_3 = -\frac{2}{3}$
- Slope $L_4 = \frac{2}{5}$, Slope $L_5 = -2$, Slope $L_6 = -\frac{4}{9}$
- Slope $AC = 0$, Slope $BC =$ undefined, Slope $AB = \frac{4}{9}$
- (a) 1 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$
(d) $-\frac{5}{6}$ (e) 0 (f) undefined
- Slope $AB = -\frac{2}{5}$, Slope $BC = -\frac{4}{3}$, Slope $CA = 1$
- (a) Slope $AB = \frac{1}{2}$, Slope $BC = -1$, Slope $CD = \frac{1}{2}$, Slope $DA = 5$
(b) Slopes of one pair of opposite sides are equal.
- (a) Slope $PQ = \frac{1}{3}$, Slope $QR = 3$, Slope $RS = \frac{1}{3}$, Slope $SP = 3$
(b) Slopes of the opposite sides of a parallelogram are equal.
- (a) $-\frac{3}{2}$ (b) $a = -2, b = -2.5$
- (b) 0.5
(c) Speed of the boy in m/s
- (b) -3
(c) rate of change of the volume of the piece of ice in cm³/min
(d) original volume of ice at $t = 0$
- (b) $\frac{1}{12}$ (c) 6 m

Review Exercise 10

- (a) $A(4, 0), B(-1, 0), C(-1, 5), D(-4, -3)$
(b) Point C
(c) (i) Slope $AB = 0$ (ii) Slope $BC =$ undefined
(iii) Slope $CD = \frac{8}{3}$
(d) (i) $y = 0$ (ii) $x = -1$
- (b) Slope of $AB = -1$
(c) (i) (2, 0) (ii) (0, 2)
- (b) Slope of $AB = \frac{3}{5}$, Slope of $BC = -\frac{5}{9}$, Slope of $CA = -2$
- (b) Slope of $PQ = \frac{1}{2}$, Slope of $QR = \frac{1}{2}$, Slope of $PR = \frac{1}{2}$
(c) Yes
(d) Slope of $OP = -\frac{1}{2}$, Slope of OQ is undefined
- (b) Slope of $AB = -\frac{3}{2}$, Slope of $BC = \frac{2}{7}$, Slope of $CD = -\frac{3}{2}$, Slope of $DA = \frac{2}{7}$
- (b) No (c) $\frac{1}{3}$ (d) (0, 2)

7. (b) $\frac{2}{5}$
 (c) cost per mile traveled
 (d) the cost displayed at the fare meter at the start of journey
 (e) \$5.80

Chapter 11 Inequalities

Try it!

1. $x < 12$ 2. $x \geq -21$ 3. Yes
 4. (a) $p - 1 < q - 1$ (b) $-4p > -4q$
 (c) $\frac{1}{5}p < \frac{1}{5}q$
 5. $x < 6$ 6. $x \geq -6$
 7. $x \leq -11$ 8. 1, 2, 3, 4, 5, 6, 7, 8
 9. 2 10. 11 months

Exercise 11.1

1. (a) Yes (b) No (c) Yes (d) Yes
 (e) No (f) No (g) Yes (h) Yes
 2. (a) $x < 5$ (b) $x > 6$ (c) $x \leq 1\frac{1}{2}$
 (d) $x \geq 2\frac{1}{5}$ (e) $x > -1\frac{1}{2}$ (f) $x \leq -3\frac{3}{4}$
 (g) $x \geq -2\frac{1}{2}$ (h) $x < -2\frac{2}{3}$
 3. (a) $x > 10$ (b) $x < -12$ (c) $x < -6$
 (d) $x \leq \frac{2}{3}$ (e) $x \geq -1\frac{3}{4}$ (f) $x > 10$
 4. (a) $x \geq 1\frac{1}{2}$ (b) $x < -8$
 (c) $x > -12$ (d) $x \leq 2\frac{11}{12}$
 5. (a) 3 (b) 9 (c) -3 (d) -7
 6. (a) 3 (b) 1 (c) -2 (d) -3

Exercise 11.2

1. (a) True (b) False (c) True (d) False
 2. (a) False (b) True (c) True (d) False
 3. (a) $<$ (b) $>$ (c) \leq (d) \leq
 4. (a) (i) $<$ (ii) $<$
 (b) (i) \leq (ii) \leq
 5. (a) $2p - 7 \leq 2q - 7$ (b) $-4 - \frac{1}{5}p \geq -4 - \frac{1}{5}q$
 6. (a) (i) $a + c < b + c$ (ii) $b + c < b + d$
 (iii) $a + c < b + d$
 (b) Their combined monthly salary is more than \$7,500.
 7. not necessary
 8. No

Exercise 11.3

1. (a) $x < 9$ (b) $x \geq 1$ (c) $x \leq 10$
 (d) $x < -3$ (e) $x \geq -1$ (f) $x < 2$
 (g) $x < 2$ (h) $x \leq 6$
 2. (a) $x > -6$ (b) $x \leq 4\frac{5}{6}$ (c) $x \leq \frac{1}{2}$
 (d) $x > -\frac{1}{2}$ (e) $x > -2$ (f) $x \geq 2$
 (g) $x \leq -\frac{31}{33}$ (h) $x > 1\frac{21}{52}$ (i) $x < -17\frac{2}{3}$
 (j) $x \geq 7\frac{3}{4}$
 3. 1, 2, 3, 4

Exercise 11.4

1. (a) \$15x
 (b) She works for less than 5 hours.
 2. (a) \$50x (b) 1, 2, 3, 4
 3. (a) $1\frac{1}{5}x$ lb (b) 16
 4. 63
 5. The speed must be more than 52 mi/hr.
 6. 1, 2, 3, 4, 5, 6, 7, 8, 9 7. 15
 8. 1, 2, 3, 4 9. after 5 hr
 10. after 6 months
 11. (a) \$56.25 (b) 1, 2, 3, ..., 26
 12. (a) 6x (b) 17 (c) $x < 20$
 13. 11
 14. 29, 31, 33 and 31, 33, 35

Review Exercise 11

1. (a) False (b) False (c) True (d) True
 (e) False
 2. (a) True (b) False (c) True (d) False
 3. (a) $x < 8$ (b) $x \leq -15$ (c) $x > -6$
 (d) $x \geq 3\frac{1}{3}$
 4. (a) 4 (b) -11
 5. (a) -4 (b) 17
 6. (a) 17 (b) $x \geq -3$
 7. (a) $x < -5$ (b) $x \leq -4$
 (c) $x > 4\frac{5}{9}$ (d) $x \leq 6$
 8. (a) $x > 1\frac{1}{9}$ (b) $x \geq -78$
 (c) $x \leq -6\frac{1}{3}$ (d) $x > -4$
 9. 36 10. 11
 11. (a) (i) $x > 5$ (ii) $y \leq -7$
 (b) fourth quadrant
 12. (a) 4n
 (b) 1, 2, 3, 4, 5
 (c) (i) A(5,0), B(5,5), C(0,5)
 (ii) Slope of AB = undefined
 Slope of OB = 1
 13. (a) 3n (b) 33 (c) 99
 14. (a) 15%
 (b) (i) \$170 (ii) \$60
 15. (a) (i) $y = 6$ (ii) $y = 0.75t$
 (c) 8 min

Chapter 12 Perimeters and Areas of Plane Figures

Try It!

1. (a) 400 cm² (b) 20 (c) 80 cm
 2. (a) 6 cm² (b) 2.4 cm
 3. Area = 706.86 cm², Circumference = 94.25 cm
 4. (a) 6 cm (b) 36 π cm² (c) 3 cm
 5. (a) 60 cm² (b) 10 cm
 6. BE = 4.8 cm 7. 110 cm²
 8. (b) 1.4 m 9. 29.5 cm²
 10. (a) 109.13 cm (b) 803.475 cm²
 11. 455 cm²

Exercise 12.1

- (a) Area = 25 in.^2 , Perimeter = 20 in.
(b) Area = $9x^2 \text{ in.}^2$, Perimeter = $12x \text{ in.}$
- (a) Area = 20 cm^2 , Perimeter = 18 cm
(b) Area = $(2x^2 - 3x) \text{ cm}^2$, Perimeter = $(6x - 6) \text{ cm}$
- (a) 160 cm^2 (b) $1.5h^2 \text{ cm}^2$
- (a) 6 cm (b) 36 cm^2
- (a) 23 cm (b) 92 cm
- (a) 16 m (b) 47 m
- (a) 14 cm (b) 490 cm^2
- (a) $3\frac{1}{3}$ (b) 5
- (a) 86 cm (b) 188 cm^2
- (a) $1,392 \text{ m}^2$ (b) 10.8%
- (a) 6.5 m (b) 8 m by 5 m
(c) Square
- (a) $420 = 2^2 \times 3 \times 5 \times 7$
(b) Possible answers:
20 cm by 21 cm, 15 cm by 28 cm

Exercise 12.2

- (a) Area = $100\pi \text{ cm}^2$, Circumference = $20\pi \text{ cm}$
(b) Area = $9x^2\pi \text{ cm}^2$, Circumference = $6\pi x \text{ cm}$
- (a) Area = 379.94 mm^2 , Circumference = 69.08 mm
(b) Area = 38.5 m^2 , Circumference = 22 m
(c) Area = 113.10 in.^2 , Circumference = 37.70 in.
- (a) 9.00 cm (b) 63.55 cm^2
- (a) 14.00 cm (b) 87.98 cm
- Area = 5.97 m^2 , Perimeter = 10.03 m
- (a) 79.97 mm (b) 384.85 mm^2
- (a) 2.19 m (b) 13.73 m (c) 7.65 m^2
- (a) 272.25 cm^2 (b) 346.64 cm^2
- 29 10. 0.57 mi 11. 5.05
- All the shaded figures have an equal area.
Shaded figures (b) and (e) have the greatest perimeter.

Exercise 12.3

- (a) 20 cm^2 (b) 54 cm^2
(c) 49 cm^2 (d) $(3x^2 + 4x) \text{ cm}^2$

	AB	DE	BC	DF	Area of ABCD
(a)	10	6	8	7.5	60
(b)	18	6	9	12	108
(c)	15	8	12	10	120
(d)	8	9	6	12	72

- (a) 20 cm^2 (b) 4 cm
- (a) 3 : 4 (b) 32 cm^2
- (a) 12 cm (b) 25 cm
- (a) 90° (b) 120 cm^2
(c) $9\frac{3}{13} \text{ cm}$
- (a) 3 m (b) 11.4 m^2
- (a) $MC = AN = 0.9 \text{ m}$ (b) 1.62 m^2
(c) 1 : 2

Exercise 12.4

- (a) 108 cm^2 (b) 39 cm^2
(c) 20 cm^2 (d) 72 cm^2
- | | a | b | h | Area |
|-----|----|----|----|------|
| (a) | 7 | 10 | 8 | 68 |
| (b) | 5 | 9 | 6 | 42 |
| (c) | 13 | 20 | 14 | 231 |
| (d) | 6 | 11 | 10 | 85 |
- (a) 2 in. (b) 1 : 2
- (a) 5 cm (b) 45 cm^2
- (a) 9 cm (b) 5 : 7 (c) $83\frac{1}{3} \text{ cm}^2$
- 210 cm^2
- (a) 2.1 m (b) 0.24 m^2 (c) \$99
- (a) $(20 - 2x) \text{ ft}$
(b) (i) 225 ft^2 (ii) $x = 5$

Exercise 12.5

- (a) Perimeter = 10 cm, Area = 4 cm^2
(b) Perimeter = 52 cm, Area = 162 cm^2
(c) Perimeter = 106 cm, Area = 205 cm^2
(d) Perimeter = 97.13 cm, Area = 653.475 cm^2
(e) Perimeter = 20 cm, Area = 19.6 cm^2
(f) Perimeter = 26 cm, Area = 20 cm^2
- (a) (ii) Perimeter = 32 cm, Area = 28 cm^2
(b) (ii) Perimeter = 74.56 cm, Area = 151.64 cm^2
- (a) 565 cm^2 (b) 416 cm^2
- (a) 13.14 cm (b) 9.30 cm^2
- (a) 160 cm (b) 336 cm^2
- (a) 14.4 in. (b) 7.2 in.^2 (c) 12.43 in.^2
- (a) 177.42 cm (b) 848.55 cm^2
- (c) 225 cm^2

Review Exercise 12

- (a) 106 cm (b) 672 cm^2 (c) 225.5 cm^2
- 32.61 cm
- (a) $18\pi \text{ cm}$ (b) $18\pi \text{ cm}^2$
- (a) 14.00 cm (b) 72.00 cm (c) 11.46 cm
- (a) 120 cm (b) 720 cm^2 (c) 20 cm
- (a) 63.66 m (b) $9,549.30 \text{ m}^2$
- (b) Perimeter = 12 cm, Area = 5 cm^2
(c) 2.24 cm
- (b) Perimeter = 117 cm, Area = 837 cm^2
- (a) 100 cm (b) 540 cm^2
(c) 450 cm^2 (d) 1 : 5

Chapter 13 Volumes and Surface Areas of Solids

Try It!

- Volume = 64 cm^3 , Area = 96 cm^2
- (a) 7 cm (b) 343 cm^3
- (a) 360 cm^3 (b) 332 cm^3 (c) 7.11 cm
- (a) 8 cm (b) 460 cm^2
- 336 cm^3 6. $1,125 \text{ m}^3$
- (b) 420 cm^3 (c) 480 cm^2
- (a) 936 cm^3 (b) 464 cm^2 (c) \$9.28

9. (a) (i) 200 m^2 (ii) $2,072,600 \text{ cm}^2$
 (b) (i) 200 m^3 (ii) $199,221,100 \text{ cm}^3$
10. (a) (i) $3,281.88 \text{ cm}^2$ (ii) 0.3282 m^2
 (b) (i) $1,146.6 \text{ cm}^3$ (ii) 0.0011 m^3
11. (a) 90 in. (b) 485 in.^2
 (c) $1,510 \text{ in.}^2$ (d) $2,910 \text{ in.}^3$
12. $12,300 \text{ cm}^3$

Exercise 13.1

1. (a) No (b) Yes
4. (a) Volume = 216 cm^3 , Area = 216 cm^2
 (b) Volume = $1,331 \text{ in.}^3$, Area = 726 in.^2
 (c) Volume = 2.197 m^3 , Area = 10.14 m^2
5. (a) Volume = 480 cm^3 , Area = 392 cm^2
 (b) Volume = 420 in.^3 , Area = 344 in.^2
 (c) Volume = 24 ft^3 , Area = 52 ft^2
7. (a) 13 cm (b) $1,014 \text{ cm}^2$ (c) $2,197 \text{ cm}^3$
8. (a) 9 cm (b) 729 cm^3

9.

Length	Width	Height	Volume	Total surface area
9 cm	6 cm	5 cm	270 cm^3	258 cm^2
11 cm	8 cm	5 cm	440 cm^3	366 cm^2
14 cm	11 cm	6 cm	924 cm^3	608 cm^2

10. (a) 140 cm^3 (b) 5.19
11. (a) 50 cm (b) $35 : 64$
12. (a) $54,000 \text{ cm}^3$ (b) $7,260 \text{ cm}^2$ (c) 4 cm
13. (a) 944 cm^2 (b) $2,688 \text{ cm}^3$
14. (a) 12 cm by 7 cm by 5 cm
 (b) 780 cm^3

Exercise 13.2

1. (a) (ii) Volume = 30 cm^3 , Area = 62 cm^2
 (b) (ii) Volume = 21 cm^3 , Area = 54 cm^2
 (c) (ii) Volume = $1,500 \text{ cm}^3$, Area = $1,020 \text{ cm}^2$
 (d) (ii) Volume = 300 cm^3 , Area = 300 cm^2
2. (a) $3,150 \text{ cm}^3$ (b) $1,308 \text{ cm}^2$
3. (a) 28 in.^2 (b) 7.5 in. (c) 236 in.^2
4. (a) (i) 15 cm
 (ii) Volume = $4,800 \text{ cm}^3$, Area = $2,220 \text{ cm}^2$
 (b) (i) 7 cm
 (ii) Volume = $2,520 \text{ cm}^3$, Area = $1,848 \text{ cm}^2$
5. (a) 2.52 m^3 (b) 12.9 m^2 (c) $\$387$
6. (a) 12 m (b) 312 m^3
7. (a) 222 in.^2 (b) $9,990 \text{ in.}^3$ (c) $2,244 \text{ in.}^2$
8. (a) 5 ft by 5 ft by 36 ft
 10 ft by 10 ft by 9 ft
 (b) 10 ft by 10 ft by 9 ft

Exercise 13.3

1. (a) $30,000 \text{ cm}^2$ (b) $136,000 \text{ cm}^2$
2. (a) 0.4 m^2 (b) 2.56 m^2
3. (a) $2,000,000 \text{ cm}^3$ (b) $39,700,000 \text{ cm}^3$
4. (a) 0.063 m^3 (b) 9.28 m^3
5. (a) 840 m^2 (b) $8,400,000 \text{ cm}^2$
6. (a) $2,000 \text{ cm}^3$ (b) 0.002 m^3

7. (a) Volume = 32 cm^3 , Area = 71.2 cm^2
 (b) Volume = $12,960 \text{ cm}^3$, Area = $3,336 \text{ cm}^2$
8. (a) Volume = 110 cm^3 , Area = 174 cm^2
 (b) Volume = $102,000 \text{ cm}^3$, Area = $14,630 \text{ cm}^2$
9. (a) 792 in.^3 (b) 636 in.^2
10. (a) $6,080 \text{ cm}^3$ (b) $2,596 \text{ cm}^2$
11. (a) (i) 1.12 m^3 (ii) $1,120,000 \text{ cm}^3$
 (b) (i) $15,625 \text{ cm}^3$ (ii) 0.015625 m^3
 (c) 71
12. (a) 314 cm (b) $3,646 \text{ cm}^2$
 (c) 6.3812 m^2 (d) 0.65628 m^3
13. (a) $1,280 \text{ ft}^3$ (b) $1,088 \text{ ft}^2$
 (c) 10 (d) 9

Review Exercise 13

1. (b) 10.5 cm^3 (c) 30.5 cm^2
2. (a) 14 in. (b) $1,176 \text{ in.}^2$ (c) $2,744 \text{ in.}^2$
3. (a) triangular prism (b) 4.33 cm^3
 (c) 18.46 cm^2
4. (a) Volume = $4,500 \text{ cm}^3$, Area = $2,110 \text{ cm}^2$
 (b) Volume = 420 cm^3 , Area = 330 cm^2
5. (b) $AD = 4.8 \text{ cm}$, $CD = 6.8 \text{ cm}$
 (d) 91.2 cm^3 (e) 128.48 cm^2
6. (a) $8,000 \text{ cm}^3$ (b) 16.67 cm (c) 20 cm
7. (a) 340 cm (b) $6,600 \text{ cm}^2$
 (c) (i) $24,400 \text{ cm}^2$ (ii) 2.44 m^2
 (d) (i) $264,000 \text{ cm}^3$ (ii) 0.264 m^3
8. (a) 480 cm^3 (b) 60 cm^3 (c) 420 cm^3
 (d) 12.5% (e) No
9. (a) $4,196 \text{ cm}^3$ (b) $4,384 \text{ cm}^2$
10. (b) Volume = $2,184 \text{ cm}^3$, Area = 856 cm^2
 (c) 2.6 min

Chapter 14 Proportions

Try It!

1. (a) $1 : 1,800$ (b) $1 : 3,500$ (c) $1 : \frac{1}{4}$
2. (a) $1 : 50$ (b) 48 cm
3. (a) 2.4 m by 2 m (b) 4.8 m^2
4. (b) 5.8 cm (c) 13 m
5. (a) $\frac{1}{79,200}$ (b) 7.5 mi (c) 4.8 in.
6. (a) 0.96 km^2 (b) 12.5 cm^2
7. (c) $w = 15t$ (d) $\$525$ (e) 45 hours
8. 240 g
9. $2,250 \text{ g}$
10. $V = 120$ or $V = \frac{120}{P}$ (e) 15 cm^3
11. 150 cm^3
12. 6 in.

Exercise 14.1

1. (a) $1 : 240$ (b) $1 : 20,000$
 (c) $1 : \frac{1}{6}$ (d) $1 : 400$
2. (a) $1 : 400$ (b) 60 ft
3. (a) $1 : 600$ (b) 12.5 cm
4. (a) $1 : \frac{1}{5}$ (b) 25 cm
5. (a) 6 in. (b) 3.5 in.

6. Length = 22.5 cm, Width = 8.75 cm
 7. 11.5 cm
 8. (a) 1 : 50 (b) 42 cm
 9. (a) $1 : \frac{1}{5}$ (b) 55 mm
 10. (a) (i) 4 m by 5 m (ii) 3 m by 4 m
 (b) (i) 99 m² (ii) 36 m²

Exercise 14.2

1. (a) 1 : 180,000 (b) 1 : 380,160
 (c) 1 : 30,000 (d) 1 : 400,000
 2. (a) $\frac{1}{63,360}$ (b) $\frac{1}{158,400}$
 (c) $\frac{1}{25,000}$ (d) $\frac{1}{400,000}$
 3. (a) $\frac{1}{50,000}$ (b) 6 km
 4. (a) 350 m (b) 7 mi
 5. (a) 8 cm (b) 50 cm
 6. (a) 400 m² (b) 2,000 m²
 7. (a) 4 cm² (b) 60 cm²
 8. (a) $\frac{1}{300,000}$ (b) 15 km
 9. (a) 1 : 40,000 (b) 2 cm²
 10. (a) 25 mi (b) 2 in.²
 11. (a) 1 : 1,500 (b) 9.6 in.
 (c) 9,375 ft²
 12. (a) $\frac{1}{300,000}$ (b) 2.25 km²
 13. (a) 900 m²
 (b) (i) 9 cm, 36 cm² (ii) 22.5 cm, 225 cm²
 (iii) 1.8 cm, 1.44 cm²
 14. (a) 17.83 cm (b) 0.58 cm²
 15. (a) 26.2 cm (b) 76.3 cm² (c) 1,605 km
 16. (a) 1,260 km (b) 1 : 5,000,000

Exercise 14.3

1. (a) directly proportional
 (b) not directly proportional
 (c) directly proportional
 (d) not directly proportional
 2. (a) not directly proportional
 (b) directly proportional
 3. (a) directly proportional
 (b) not directly proportional
 (c) not directly proportional
 (d) directly proportional
 4. $p = 12, q = 36$
 5. (a) 30 (b) 9
 6. (a) 48 (b) 7
 7. (c) A straight line passing through the origin and slope is positive.
 (d) $P = 15x$ (e) 120
 8. (a) No (b) Yes
 (c) $m = 0.65x^3$ (d) 473.85 g
 9. \$420 (e) 525 g
 11. (a) 2.0 gal (b) 37.0 mi
 12. (a) 1.78 s (b) 0.25 m
 13. (a) 180 m (b) 7 s

Exercise 14.4

1. (a) not inversely proportional
 (b) inversely proportional
 (c) inversely proportional
 (d) not inversely proportional
 2. (a) No (b) Yes
 3. (a) inversely proportional
 (b) not inversely proportional
 (c) inversely proportional
 (d) not inversely proportional
 4. $p = 8, q = 10$
 5. (a) 21 (b) 7
 6. (a) 96 (b) 36
 7. (d) $m = \frac{600}{d}$ (e) 24
 8. (a) No (b) Yes
 (c) $x^2y = 900$ (d) 400
 9. (a) 1.92 (b) 4
 10. (a) 2 (b) 3.6, 10
 11. 1.5 mins (b) 8 mins
 13. (a) 320 Hz (b) 32 cm
 14. (a) 126 units (b) 6 in.
 15. (a) $746\frac{2}{3}$ m/s (b) 64 g

Review Exercise 14

1. (a) 1 : 5 (b) 0.76 cm
 2. (a) 1 : 200 (b) 5 m (c) 3 m by 4 m
 3. (a) 1 : 200 (b) 3 in. (c) 1,250 ft²
 4. (a) 140 m (b) 12.5 cm²
 5. (a) 10 cm
 (b) (i) 16,200 m² (ii) 6.48 cm²
 6. (c) $y = 5x$ (d) 35 carats
 7. (a) 225 in. (b) \$16
 8. (a) 9 cm
 (b) (i) 8 cm (ii) 228 g
 9. (c) y is directly proportional to x^2 .
 (d) $y = 2x^2$ (e) 12.5
 10. (a) 0.5 kg (b) 75
 11. (a) $y = \frac{720}{x}$ (b) 30 (c) 48
 (d) The area of the rectangle is always 720 in.²
 12. (a) 576 units (b) 3 m
 13. (a) 4 hours (b) 48 workers
 14. 2.4 lb

Chapter 15 Data Handling

Try it!

2. 42 kg 3. 13 4. 1.1 kg
 5. (b) Basketball: 80 inches, Soccer: 71 inches
 6. (c) Jamie: 2, Brenda: 0.75
 7. 27.5 cm
 8. (a) 74.5 m² (b) 88 m² (c) 80 m²
 9. A: 72, B: No mode, C: 71, 78

Exercise 15.1

1. (a) Conducting Surveys (b) Reading Publications
 (c) Taking Measurements (d) Taking Measurements
 (e) Conducting Survey (f) Conducting Survey
 (g) Observing Outcomes (h) Observing Outcomes

- (i) Taking Measurements (j) Reading Publications
2. (a) Observing Outcomes
(b) No
3. (a) (i) Reading Publications
(ii) Conducting Surveys
(iii) Conducting Surveys
(b) Method (iii)
4. (a) Conducting Survey (b) Question 1

Exercise 15.2

1. (a) 12 (b) 3 to 11
2. (a) 13 (b) 6 to 11
3. (a) A: 56 g to 63 g
B: 56 g to 63 g
(b) A: Cluster around 60 g and 61 g and are quite spread out
B: Cluster around 60 g to 63 g with only one value at 56 g
4. (a) 40%
5. (a) Yes

Exercise 15.3

1. (a) $17\frac{1}{3}$ (b) 11.25 (c) 10.4 (d) 18.5
2. 145 3. 63
4. (a) 32.75 (b) 15.3
5. (b) Set A: 1.78, Set B: 0.444, Set C: 4
6. \$22.40 7. 23°C
8. 260 g 9. 39 years old
10. (a) 21 (b) 23 (c) 47
11. 2
12. (b) Sixth grade: 53 kg (d) Sixth grade: 0.8
Seventh grade: 57 kg Seventh grade: 2.4
13. 62 14. 50 kg
15. (a) 8.8 (b) 8.7
(c) Bryan (d) Bryan: 0.7, Josh: 0.6
16. 275 mi

Exercise 15.4

1. (a) 17 (b) 41 (c) 159 (d) 28.5
2. (a) 21.5 s (b) 24 °C (c) 21 m (d) 4.5 g
3. (a) 12 m² (b) 11 m²
4. (a) 3.27 (b) 3.19
5. (a) 7 (b) 14
(c) 11 (d) No
6. (a) 34 cm (b) 33 cm (c) median
7. (a) 0.93% (b) 0.92%
8. (a) \$4,630 (b) \$4,760 (c) median

Exercise 15.5

1. (a) 4 (b) 2, 8 (c) No mode
(d) 3.6
2. (a) 0, 2 (b) 20
3. 46
4. (a) $7\frac{1}{2}$ (b) $6\frac{3}{4}$ (c) No
5. (a) -2.5°C (b) -1.2°C
(c) -1.4°C
6. (a) 20 (b) 2 (c) 2.5 (d) 3
7. (a) 192
(b) mean = 16, median = 16, mode = 17
(c) median and mean

8. (a) 30
(b) median = 1.5, mode = 2
(c) mean = 1.5
(d) mean
9. (a) mean = 42 hr, median = 44 hr, mode = 45 hr
(b) median

Review Exercise 15

1. (a) Conducting Survey
2. (c) 12%
(d) mode = 12.0 fl oz
median = 11.9 fl oz
(e) mean = 11.9 fl oz
3. (a) mean = 3
median = 2.5
mode = 2
(b) 1.2
4. (a) mean = 52 kg
median = 48 kg
mode = 43 kg
(b) median
5. (a) 28 years old (b) 27 years old
6. 4, 4, 5, 8, 9
7. (a) 8 (b) \$2,500
(c) \$3,000 (d) \$2,800
8. (b) A: 5.0 pounds, B: 5.05 pounds
(c) A: 5.0 pounds, B: 5.0 pounds
(d) A: 0.06 pounds, B: 0.22 pounds
9. (a) mean: 59
median: 65
(b) mean: 58
median: 60.5
(d) Group A: 17
Group B: 14
(e) Scores in Group A vary more and are more spread out.
10. (a) 5 (b) 7 (c) 1

Chapter 16 Probability of Simple Events

Try It!

1. (a) {S, T, U, D, E, N} (b) 6
2. (a) {red, blue, white} (b) 3
(c) Yes
3. (a) No
(b) {x : x is an integer and 2 < x < 7}
4. Yes
5. (a) P ⊂ Q (b) Q = R
(c) P ⊂ S (d) Q ⊄ S, S ⊄ Q
6. (a) {all carpentry tools} (b) {x : x is an odd number}
7. ∅, {1}, {2}, {3}, {4}, {1, 2}, {1, 3}, {1, 4}, {2, 3}, {2, 4}, {3, 4}, {1, 2, 3}, {1, 2, 4}, {1, 3, 4}, {2, 3, 4}, {1, 2, 3, 4}
8. (a) (i) P' = {a, c, x} (ii) ∅
(b) Q = ξ̂
(c) ξ̂' contains the rest of the letters.
9. (a) $\frac{1}{6}$ (b) $\frac{1}{3}$
10. (a) $\frac{1}{2}$ (b) $\frac{1}{13}$ (c) $\frac{1}{26}$
11. (a) $\frac{3}{4}$ (b) 0

12. (a) $S = \{A, B, C, D, E\}$ (b) $\{A, C, D, E\}$
 (c) $n(S) = 5, n(F) = 4$ (d) $P(F) = \frac{4}{5}$
13. (a) $S = \{00, 01, 02, \dots, 59\}$
 (b) $G = \{05, 15, 25, 35, 45, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59\}$
 (c) $n(S) = 60, n(G) = 15$
 (d) $P(G) = \frac{1}{4}$
 (e) $P(G') = \frac{3}{4}$
14. (a) 1 (b) 0 (c) $\frac{11}{12}$

Exercise 16.1

1. (a) $A = \{m, a, t, h, e, i, c, s\}$
 (b) $B = \{W, S, H, N, G, T\}$
 (c) $C = \{\text{Summer, Spring, Autumn, Winter}\}$
 (d) $D = \{\text{Monday, Tuesday, Wednesday, Thursday, Friday, Saturday, Sunday}\}$
2. (a) $P = \{5, 0, 1, 3, 4\}$ (b) $Q = \{2\}$
 (c) $R = \{9, 18, 27, 36, 45\}$ (d) $S = \{0, 1, 2, 3, 4, \dots\}$
3. (a) $\{x : x \text{ is a factor of } 12\}$ (b) $\{x : x \text{ is a multiple of } 3\}$
 (c) $\{x : x \text{ is a prime number}\}$
4. (a) True (b) False (c) False (d) True
5. (a) True (b) True (c) True (d) False
6. (a) $\phi, \{on\}, \{off\}, \{on, off\}$
 (b) $\{on, off\}$
7. (a) $\phi, \{3\}, \{6\}, \{9\}, \{3, 6\}, \{3, 9\}, \{6, 9\}, \{3, 6, 9\}$
 (b) 7
8. (a) $\{fog, snow, dew, ice\}$
 (b) $\{fog, cloud, rain, dew, ice\}$
9. (a) $\xi = \{c, o, m, p, l, e, n, t\}, A = \{e, l, m, n, t\}$
 (b) $A' = \{c, o, p\}$
10. (a) 7 (b) 3 (c) 4 (d) 0
11. (a) (i) $B \subset A$ (ii) $A = C$
 (iii) $B \subset D$ (iv) $C \not\subset D, D \not\subset C$
 (b) (i) 3 (ii) 1
12. (a) False (b) False (c) True (d) False
13. (a) (i) Not necessary (ii) Necessary
 (b) $A \subset C$
14. (a) $\{\text{all animals}\}$ (b) $\{\text{all gases}\}$
 (c) $\{\text{All U.S. states}\}$ (d) $\{\text{all integers}\}$
15. (a) $\xi = \{0, 1, 2, 3, \dots\}, A = \{1, 3, 5, 7, \dots\}, B = \{4, 8, 12, 16, \dots\}$
 (b) (i) $A' = \{0, 2, 4, 6, \dots\}$
 (ii) $A' = \{x : x \text{ is not an odd integer}\}$
16. (a) $R = \{\text{red, orange, yellow, green, blue, indigo, violet}\}$
 (b) No
 (c) No
 (d) $\{\text{all colors}\}$
17. (a) (i) $M = \{\text{chicken, fish}\}$
 (ii) $B = \{\text{coffee, tea, fruit juice}\}$
 (b) (i) $\{\text{all main dishes}\}$ (ii) $\{\text{all beverages}\}$
 (c) $M \subset E$
18. (a) $A' = \{\text{all non-seventh grade students}\}, B' = \{\text{all students who are not seventh grade female students}\}$
 (b) (i) $B \subset A$ (ii) $A' \subset B'$
19. (a) $\xi = \{1, 2, 3, 6, 7, 8\}$ (b) $C = \{3, 8\}$

Exercise 16.2

1. (a) $\frac{1}{2}$ (b) $\frac{1}{2}$
2. (a) $\frac{1}{6}$ (b) $\frac{1}{2}$ (c) $\frac{1}{3}$
3. (a) 0 (b) $\frac{1}{13}$ (c) $\frac{9}{13}$
4. (a) $\frac{1}{8}$ (b) $\frac{1}{4}$
5. (a) $\frac{5}{9}$ (b) $\frac{4}{9}$
6. (a) $\frac{4}{5}$ (b) $\frac{1}{5}$ (c) 0
7. (a) $\frac{3}{10}$ (b) $\frac{2}{5}$ (c) $\frac{1}{5}$
8. $\frac{5}{6}$
9. (a) $\frac{1}{3}$ (b) $\frac{5}{12}$ (c) 0
10. (a) $\frac{2}{11}$ (b) $\frac{7}{11}$ (c) 0
11. (a) 0 (b) $\frac{3}{5}$
 (c) $\frac{17}{20}$ (d) $\frac{1}{4}$
12. $n = 12$
13. (a) $\frac{1}{5}$ (b) $\frac{3}{19}$
14. No 15. No

Exercise 16.3

1. (a) $\{HH, HT, TH, TT\}$ where T is tail and H is head
 (b) $\{S, Q, U, A, R, E\}$
 (c) $\{1, 3, 5, 7, 9, 11\}$ (d) $\{2, 3, 5, 7, 11, 13\}$
 (e) $\{D, I, V, E\}$
 (f) $\{\text{red jelly bean, blue jelly bean, green jelly bean}\}$
2. (a) $S = \{\text{Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday}\}$
 (b) $F = \{\text{Tuesday, Thursday}\}$
 (c) $\frac{2}{7}$ (d) 1
3. (a) $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20\}$
 (b) $\{3, 6, 9, 12, 15, 18\}$
 (c) $\frac{3}{10}$
 (d) $\frac{7}{10}$
4. (a) $S = \{\text{red, yellow, blue, green}\}$
 (b) (i) $\frac{1}{4}$ (ii) 0 (iii) $\frac{3}{4}$
5. (a) $S = \{11, 13, 18, 31, 33, 38, 81, 83, 88\}$
 (b) (i) $D = \{11, 33, 88\}$
 (ii) $\frac{1}{3}$
 (c) (i) $E = \{38, 81, 83, 88\}$
 (ii) $\frac{4}{9}$ (iii) $\frac{5}{9}$
6. (a) $S = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 (b) (i) $G = \{8, 9, 10\}$
 (ii) $G' = \{0, 1, 2, 3, 4, 5, 6, 7\}$
 (c) No

7. (a) $S = \{205, 208, 250, 258, 280, 285, 502, 508, 520, 528, 580, 582, 802, 805, 820, 825, 850, 852\}$
 (b) (i) $\frac{1}{3}$ (ii) $\frac{2}{3}$
8. (a) (i) $S = \{\text{red, green, blue, yellow, brown}\}$
 (ii) No
 (b) (i) 0 (ii) $\frac{3}{20}$
 (iii) 1 (iv) $\frac{17}{20}$
9. (a) $S = \{ABC, ACB, BAC, BCA, CAB, CBA\}$
 (b) $H = \{BAC, BCA\}$
 (c) $\frac{1}{3}$
10. (a) $S = \{\text{Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Vietnam}\}$
 (b) (i) 1 (ii) 0
 (c) $\frac{1}{5}$
11. (a) $\frac{1}{3}$ (b) 216
14. (a) $\{2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12\}$
 (b) No
14. (a) $S = \{HH, HT, TH, TT\}$
 (b) (i) $\frac{1}{4}$ (ii) $\frac{1}{2}$
15. (a) $S = \{\$7, \$12, \$52, \$15, \$55, \$60\}$
 (b) (i) 0 (ii) $\frac{2}{3}$ (iii) 0
16. (a) $S = \{AP, AQ, AR, AS, BP, BQ, BR, BS, CP, CQ, CR, CS\}$
 (b) $\frac{1}{12}$
 (c) (i) $\{AQ, BQ, CQ\}$ (ii) $\frac{1}{4}$
 (iii) $\frac{3}{4}$
17. (a) (i) $\frac{1}{100}$ (ii) $\frac{1}{10}$
 (iii) $\frac{9}{10}$ (iv) $\frac{1}{10}$
 (b) \$13,500

Review Exercise 16

1. $\frac{4}{5}$
2. (a) $\frac{1}{7}$ (b) $\frac{4}{7}$
3. (a) 4 (b) No (c) Yes
 (d) $\{\text{all stationeries}\}$
 (e) $B = \{\text{ruler, pencil, marker}\}$
4. (a) $A = \{l, a, t, e, r\}, B = \{l, a, t, e, r\}, C = \{l, e, t, r\}$
 (b) 4
 (c) (i) $A = B$ (ii) $C \subset B$
5. (a) $A = \{\text{square, rectangle}\},$
 $B = \{\text{square, rhombus}\},$
 $C = \{\text{square, rectangle, parallelogram, rhombus}\}$
 (b) $\{\text{all types of quadrilaterals}\}$
 (c) $B \subset C$
 (d) No
6. (a) $P = \{1, 2, 3, 4, 6, 9, 12, 18, 36\},$
 $Q = \{1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60\}$
 (b) No
 (c) $R = \{1, 2, 3, 4, 6, 12\}$
7. $\frac{5}{12}$
8. 0.45
9. (a) $\frac{1}{2}$ (b) $\frac{5}{6}$
10. (a) 0 (b) 1 (c) $\frac{1}{6}$ (d) $\frac{5}{6}$
11. (a) $\frac{7}{30}$ (b) $\frac{1}{3}$ (c) $\frac{1}{3}$
12. (a) 1 (b) $\frac{3}{10}$ (c) $\frac{7}{10}$ (d) $\frac{1}{2}$
13. (a) $S = \{2, 3, 5, 7, 11, 13, 17, 19, 23, 29\}$
 (b) (i) $\frac{1}{2}$ (ii) $\frac{2}{5}$ (iii) $\frac{1}{10}$
 (c) 1

Chapter 17 Probability of Combined Events

Try It!

1. (b) (i) $\frac{1}{6}$ (ii) $\frac{1}{3}$
2. (a) $\frac{5}{36}$ (b) $\frac{1}{6}$
3. (b) (i) $\frac{1}{4}$ (ii) $\frac{1}{2}$
4. (b) (i) $\frac{1}{6}$ (ii) 0
 (iii) $\frac{1}{3}$ (iv) $\frac{2}{3}$
5. (a) $\frac{3}{4}$ (b) $\frac{7}{9}$ (c) $\frac{2}{9}$
6. (a) $\frac{1}{2}$ (b) $\frac{1}{2}$
7. $\frac{2}{15}$ 8. $\frac{6}{7}$
9. (a) 0.003375 (b) 0.996625
10. (a) $\frac{29}{60}$
11. (a) $\frac{54}{175}$ (b) $\frac{24}{245}$

Exercise 17.1

1. (b) (i) $\frac{1}{4}$ (ii) $\frac{3}{4}$
2. (b) (i) $\frac{1}{4}$ (ii) $\frac{2}{3}$
3. (b) (i) $\frac{1}{4}$ (ii) $\frac{1}{3}$
4. (b) $\frac{1}{8}$
5. (b) $\frac{1}{3}$
6. (b) (i) $\frac{1}{9}$ (ii) $\frac{2}{3}$
7. (b) (i) $\frac{1}{5}$ (ii) $\frac{3}{10}$ (iii) $\frac{1}{2}$
8. (b) (i) $\frac{1}{4}$ (ii) $\frac{3}{16}$ (iii) $\frac{1}{4}$
9. (b) (i) $\frac{1}{8}$ (ii) $\frac{3}{8}$ (iii) $\frac{7}{8}$

10. (b) (i) $\frac{1}{6}$ (ii) $\frac{1}{3}$ (iii) $\frac{2}{3}$
 11. (b) (i) $\frac{1}{4}$ (ii) $\frac{3}{8}$ (iii) $\frac{3}{16}$
 12. (b) $\frac{1}{6}$
 13. (b) $\frac{7}{12}$

Exercise 17.2

1. (a) No (b) Mutually exclusive
 (c) Mutually exclusive (d) No
 (e) Mutually exclusive (f) No
2. (a) $\frac{1}{10}$ (b) $\frac{3}{20}$ (c) $\frac{1}{4}$
3. (a) $\frac{1}{4}$ (b) $\frac{5}{12}$ (c) $\frac{2}{3}$
4. (a) $\frac{3}{8}$ (b) $\frac{1}{4}$ (c) $\frac{5}{8}$
5. $\frac{3}{7}$ 6. $\frac{2}{3}$ 7. $\frac{1}{2}$
8. (a) $\frac{2}{13}$ (b) $\frac{4}{13}$
9. (a) $\frac{1}{2}$ (b) $\frac{7}{10}$ (c) $\frac{3}{5}$
10. (a) $\frac{1}{6}$ (b) $\frac{1}{4}$ (c) $\frac{5}{12}$
11. (a) 1, 2, 3, 4, 5, 6, 10, 12, 15, 20, 30, 60
 (b) (i) $\frac{5}{12}$ (ii) $\frac{5}{12}$ (iii) $\frac{5}{6}$
12. (b) (i) A: 2 and 5, 3 and 4, 4 and 3
 B: 1 and 1, 1 and 2, 1 and 3, 1 and 4, 1 and 5,
 2 and 1, 3 and 1, 4 and 1
 (ii) Mutually exclusive
 (iii) $P(A) = \frac{3}{20}$, $P(B) = \frac{2}{5}$, $P(A \text{ or } B) = \frac{11}{20}$
13. (a) $\frac{5}{18}$ (b) $\frac{1}{3}$
14. (a) 0.57 (b) 0.43
15. (a) 0.51 (b) 0.17 (c) 0.37
16. (a) No. There are students who take both history and geography.
 (b) Number of students who take both geography and history, or the number of students taking geography and not history, or the number of students taking history but not geography

Exercise 17.3

1. (b) (i) $\frac{9}{64}$ (ii) $\frac{15}{32}$
2. (b) (i) $\frac{1}{36}$ (ii) $\frac{25}{36}$ (iii) $\frac{11}{36}$
3. (b) (i) $\frac{1}{25}$ (ii) $\frac{14}{45}$ (iii) $\frac{142}{225}$
4. $\frac{2}{7}$
5. (a) $\frac{1}{16}$ (b) $\frac{2}{169}$
6. (a) 0.015 (b) 0.765
7. (a) $\frac{1}{8}$ (b) $\frac{1}{24}$
8. (a) $\frac{1}{4}$ (b) $\frac{13}{24}$

9. $\frac{729}{1,000}$
10. (a) $\frac{1}{45}$ (b) $\frac{32}{45}$
11. (a) $\frac{1}{9}$ (b) $\frac{25}{72}$ (c) $\frac{5}{24}$
12. (a) $\frac{1}{216}$ (b) $\frac{1}{216}$ (c) $\frac{1}{108}$
13. (a) $\frac{8}{21}$ (b) $\frac{103}{105}$ (c) $\frac{8}{105}$
14. 0.1849
15. 18%
16. (a) 0.0025 (b) 0.9975
17. (a) $\frac{1}{64}$ (b) $\frac{27}{64}$
18. (a) 2 (b) No

Exercise 17.4

1. (b) (i) $\frac{1}{6}$ (ii) $\frac{5}{18}$
2. (b) (i) $\frac{1}{22}$ (ii) $\frac{9}{22}$
3. $\frac{1}{300}$ 4. $\frac{51}{145}$
5. (a) $\frac{1}{21}$ (b) $\frac{10}{21}$
6. (a) $\frac{25}{102}$ (b) $\frac{4}{663}$
7. $\frac{23}{40}$ 8. $\frac{132}{175}$
9. (a) $\frac{2}{7}$ (b) $\frac{4}{7}$
10. (a) $\frac{3}{7}$ (b) $\frac{9}{28}$
 (c) $\frac{19}{28}$ (d) $\frac{1}{8}$
11. (a) $\frac{87}{632}$ (b) $\frac{72}{395}$
12. (a) $\frac{51}{145}$ (b) $\frac{72}{145}$
13. 0.014 14. $\frac{1}{4}$
15. (a) $\frac{3}{7}$ (b) Yes

Review Exercise 17

1. $\frac{1}{2}$
2. (a) $\frac{17}{20}$ (b) $\frac{1}{3}$ (c) $\frac{2}{3}$ (d) $\frac{31}{60}$
3. (a) $\frac{1}{6}$ (b) $\frac{1}{6}$ (c) $\frac{1}{3}$ (d) $\frac{2}{3}$
4. 0.3666
5. (a) $\frac{28}{153}$ (b) $\frac{80}{153}$
6. (a) $\frac{1}{125}$ (b) $\frac{64}{125}$ (c) $\frac{124}{125}$
7. (a) $\frac{1}{5}$ (b) $\frac{7}{15}$
8. (a) $\frac{1}{6}$ (b) $\frac{4}{9}$
9. (a) (i) $\frac{17}{60}$ (ii) $\frac{1}{4}$ (iii) $\frac{7}{40}$