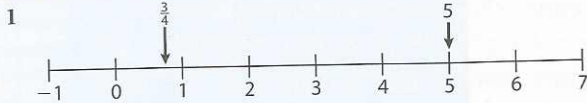




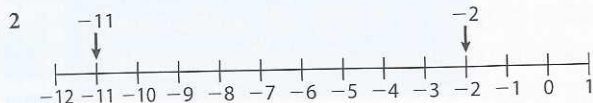
Answers

Chapter 1

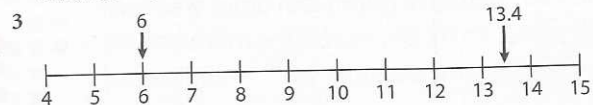
Exercise 1.1



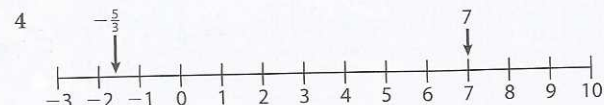
$$\text{distance} = \frac{17}{4}$$



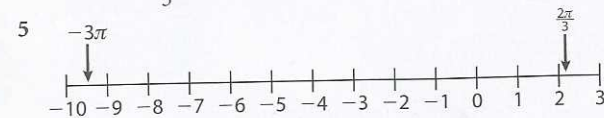
$$\text{distance} = 9$$



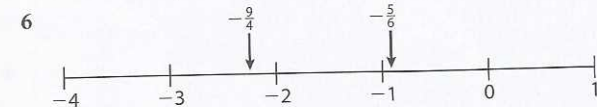
$$\text{distance} = 7.4$$



$$\text{distance} = \frac{26}{3}$$



$$\text{distance} = \frac{11\pi}{3}$$



$$\text{distance} = \frac{17}{12}$$

- | | | |
|------------------------------------|------------------------------------|------------------------------------|
| 7 $-5 \leq x \leq 3$ | closed interval, bounded | |
| 8 $-10 < x \leq -2$ | half-open interval, bounded | |
| 9 $x \geq 1$ | half-open interval, unbounded | |
| 10 $x < 4$ | open interval, unbounded | |
| 11 $0 \leq x < 2\pi$ | half-open interval, bounded | |
| 12 $a \leq x \leq b$ | closed interval, bounded | |
| 13 $[6, \infty[$ | 14 $]-\infty, -8]$ | 15 $]2, 9[$ |
| 16 $[0, 12[$ | 17 $]-5, \infty[$ | 18 $[-3, 3]$ |
| 19 $x \geq 6$ | 20 $4 \leq x < 10$ | 21 $[4, 10[$ |
| 21 $x < 0$ | 22 $0 < x < 25$ | 23 $]0, 25[$ |
| 23 $\{1, 3, 5, 7\}$ | 24 $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ | 25 \emptyset |
| 25 \emptyset | 26 $\{1, 2, 3, 4, 5, 6, 7, 8\}$ | 27 $\{2, 4, 6\}$ |
| 27 $\{2, 4, 6\}$ | 28 $\{1, 2, 3, 4, 5, 6, 7, 8, 9\}$ | 29 $\mathbb{Z} \subset \mathbb{R}$ |
| 29 $\mathbb{Z} \subset \mathbb{R}$ | 30 $\mathbb{N} \subset \mathbb{Q}$ | 31 $\mathbb{N} \subset \mathbb{Z}$ |
| 32 $\mathbb{Z} \subset \mathbb{Q}$ | 33 $ x < 6$ | 34 $ x \geq 4$ |
| 35 $ x \leq \pi$ | 36 $ x > 1$ | 37 13 |
| 38 4 | 39 -25 | 40 -5 |
| 41 $3 - \sqrt{3}$ | 42 -1 | |
| 43 $x = -5, 5$ | 44 $x = -1, 7$ | |
| 45 $x = -4, 16$ | 46 $x = -2, -\frac{4}{3}$ | |

Exercise 1.2

- | | | |
|---------------------------|-------------------------|----------------------------|
| 1 $2\sqrt{2}$ | 2 2 | 3 6 |
| 4 3 | 5 2 | 6 $\frac{\sqrt{3}}{2}$ |
| 7 $5\sqrt{2}$ | 8 $3\sqrt{7}$ | 9 $12\sqrt{2}$ |
| 10 $4\sqrt{2}$ | 11 $10\sqrt{3}$ | 12 $10\sqrt{3} - \sqrt{2}$ |
| 13 $4\sqrt{6} + \sqrt{3}$ | 14 $\frac{\sqrt{2}}{2}$ | 15 $\frac{3\sqrt{5}}{5}$ |
| 16 $\frac{2\sqrt{21}}{7}$ | 17 $\frac{\sqrt{3}}{9}$ | 18 $\frac{4\sqrt{2}}{3}$ |
| 19 $\frac{\sqrt{6}}{3}$ | | |

Exercise 1.3

- | | | |
|-------------------------|-------------------------|---------------------|
| 1 2 | 2 27 | 3 16 |
| 4 16 | 5 8 | 6 8 |
| 7 $\frac{4}{9}$ | 8 $\frac{3}{4}$ | 9 $\frac{125}{8}$ |
| 10 $\frac{1}{9}$ | 11 1 | 12 $\frac{16}{3}$ |
| 13 $\frac{-64}{27}$ | 14 $3a^2b^4$ | 15 $-3a^3b^6$ |
| 16 $9a^2b^4$ | 17 $10x^5y^3$ | 18 $\frac{4}{3w}$ |
| 19 $\frac{3m^6}{4n^4}$ | 20 $\frac{m^6}{8n^6}$ | 21 3^{2m+n} |
| 22 $\frac{y^2}{x^2}$ | 23 $\frac{b}{4a^5}$ | 24 x |
| 25 $\frac{4(a+b)^2}{3}$ | 26 $\frac{(x+4y)^3}{2}$ | 27 $\sqrt{p^2+q^2}$ |
| 28 2^{6n+2m} | | |

Exercise 1.4

- | | | |
|-------------------------|-------------------------|-------------------------|
| 1 2.54×10^2 | 2 7.81×10^{-3} | 3 7.41×10^6 |
| 4 1.04×10^{-6} | 5 4.98 | 6 1.99×10^{-3} |
| 7 1.49×10^8 | 8 8.99×10^{-5} | 9 0.0027 |
| 10 50 000 000 | 11 0.000 000 090 35 | |
| 12 4 180 000 000 000 | 13 2.5×10^3 | 14 2×10^4 |
| 15 8.2×10^{-5} | 16 5.6×10^{18} | |

Exercise 1.5

- | | |
|--|----------------------------|
| 1 $m^2 - n - 20$ | 2 $10y^2 - 9y - 9$ |
| 3 $x^2 - 49$ | 4 $25m^2 + 20m + 4$ |
| 5 $x^3 - 3x^2 + 3x - 1$ | 6 $1 - a$ |
| 7 $a^2 + a - b^2 + b$ | 8 $4x^2 + 12x^2 - y^2 + 9$ |
| 9 $a^3 + 3a^2b + 3ab^2 + b^3$ | 10 $a^2x^2 + 2abx + b^2$ |
| 11 -4 | 12 $4x^3 - 8x^2 + 13x - 5$ |
| 13 $12(x+2)(x-2)$ | 14 $x^2(x-6)$ |
| 15 $(x+4)(x-3)$ | 16 $-(m-1)(m+7)$ |
| 17 $(x-8)(x-2)$ | 18 $(y+1)(y+6)$ |
| 19 $3(n-5)(n-2)$ | 20 $2x(x+1)(x+9)$ |
| 21 $(a+4)(a-4)$ | 22 $(3y+1)(y-5)$ |
| 23 $(5n^2+2)(5n^2-2)$ | 24 $a(x+3)^2$ |
| 25 $(m+1)^2(2n-1)$ | 26 $(x+1)(x-1)(x^2+1)$ |
| 27 $y(6-y)$ | 28 $2y^2(2y^2-5y-48)$ |
| 29 $(2x-5)^2$ | |
| 30 $(2x+3)^{-3}(4x+3) = \frac{4x+3}{(2x+3)^3}$ | |

- 31 $\frac{1}{x+1}$ 32 $\frac{1}{2n}$ 33 $\frac{a+b}{5}$
 34 $x+2$ 35 -1 36 $4x+h$
 37 $\frac{-2x+5}{15}$ 38 $\frac{b-a}{ab}$ 39 $\frac{-8x+6}{2x-1}$
 40 $\frac{x^2+x+3}{x^2+3x}$ 41 $\frac{2x}{x^2-y^2}$ 42 $\frac{-2}{x-2}$
 43 6 44 $\frac{3y-10}{y^2-3y-10}$ 45 $\frac{1}{ab-b^2}$
 46 $\frac{-5x^2-5x}{2}$ 47 $\frac{3+\sqrt{2}}{7}$ 48 $10-5\sqrt{3}$
 49 $\frac{11+4\sqrt{6}}{5}$ 50 $\frac{7-\sqrt{5}}{44}$

Exercise 1.6

- 1 $x = h - \frac{n}{m}$ 2 $a = \frac{v^2+t}{b}$
 3 $b_1 = \frac{2A}{h} - b_2$ 4 $r = \sqrt{\frac{2A}{\theta}}$
 5 $k = \frac{gh}{f}$ 6 $t = \frac{x}{a+b}$
 7 $r = \sqrt[3]{\frac{3V}{\pi h}}$ 8 $k = \frac{g}{F(m_1+m_2)}$
 9 $y = -\frac{2}{3}x - 5$ 10 $y = -4$
 11 $y = \frac{5}{4}x + 6$ 12 $x = \frac{7}{3}$
 13 $y = -4x + 11$ 14 $y = -\frac{5}{2}x - 7$
 15 a) 17 b) $(0, \frac{5}{2})$
 16 a) $\sqrt{40}$ b) $(2, 3)$
 17 a) $\frac{\sqrt{82}}{3}$ b) $(-1, \frac{7}{6})$
 18 a) $\sqrt{533}$ b) $(1, \frac{11}{2})$
 19 $k = 1$ or 9 20 $k = -11$ or -3
 21 $(\sqrt{5})^2 + (\sqrt{45})^2 = (\sqrt{50})^2$
 22 Sides are: $\sqrt{29}, \sqrt{29}, \sqrt{58}$
 23 Sides are: $\sqrt{45}, \sqrt{10}, \sqrt{45}, \sqrt{10}$
 24 $(5, 1)$ 25 $(4, \frac{1}{2})$ 26 $(3, -4)$ 27 $(3.8, -1.6)$
 28 No solution 29 $(-1, 2)$ 30 $\frac{5}{7}, \frac{3}{7}$ 31 $(-3, -8)$
 32 Lines are coincident; solution set is all points on the line
 $y = -\frac{1}{4}x - \frac{3}{4}$
 33 $(\frac{20}{3}, \frac{40}{3})$ 34 $(\frac{1}{2}, 3)$ 35 $(-5, 10)$
 36 $(5, -3)$ 37 $(0.99, -2.33)$ 38 $(\frac{11}{19}, -\frac{18}{19})$