Chapter 1
Integers, powers and roots

Student Book

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Exercise 1A

1.

Rational: -8, 0.7, $\sqrt[3]{27}$, 1007, $\sqrt{81}$, $\frac{8}{11}$, 0.8, $2\frac{3}{5}$, $\sqrt[3]{-8}$

Irrational: 15.4 π , $-\sqrt{3}$, $\sqrt[3]{5}$, $\sqrt{10}$

Not: $\sqrt{-5}$

2. D

3.

a) -2, 81, $\sqrt{9}$

b) 0.3, $\frac{2}{9}$

c) 3π , $\sqrt{5}$

4. a) irrational

   b) rational or irrational

   c) rational

5. a) False

   b) False

   c) True

   d) True

   e) False

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Exercise 1B

1. **a**: should be less than 5 as 20 is less than 25.

   c: should be bigger than 9.1 as 95 is a lot closer to 100 than it is to 81.

   d: should be bigger than 7 as 50 is bigger than 49.

2. a) True

   b) False

   c) True

   d) False

   e) True

    f) True

3.

a) 7

b) 8

c) $59 - 49 = 10$

$64 - 49 = 15$

$10/15 \approx 0.7$ (to 1 d.p.)

$7 + 0.7 = 7.7$

7.

a) 2

b) 3

c) $10 - 8 = 2$

$27 - 8 = 19$

$2/19 \approx 0.1$ (to 1 d.p.)

$2 + 0.1 = 2.1$

12.

a) Area of the square = Length ^{2}

Length = $\sqrt{Area\ of\ the\ square}$

$\sqrt{16}$ = 4

$\sqrt{25}$ = 5

17 - 16 = 1

25 – 16 = 9

1/9 ≈ 0.1 (to 1 d.p.)

4 + 0.1 = 4.1 cm = 41 mm

13.

a) Volume of the cube = Length ^{3}

Length = $\sqrt[3]{Volume\ of\ the\ cube}$

$\sqrt[3]{27}$ = 3

$\sqrt[3]{64}$ = 4

50 - 27 = 23

64 - 27 = 37

23/37 ≈ 0.6 (to 1 d.p.)

3 + 0.6 = 3.6 cm = 36 mm

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Exercise 1C

1.

   a) 4

   b) 5-6

   c) 4

2.

   a) $\frac{1}{7}$

   b) $\frac{1}{3}$

   c) $\frac{1}{4}$

   d) $\frac{1}{8}$

   e) $\frac{1}{25}$

   f) $\frac{1}{27}$

3.

   a) 2^3

   b) 2^1

   c) 2^{-1}

   d) 2^{-4}

   e) 2^0

4.

   a) 3^3

   b) 3^{-2}

   c) 3^{-1}

   d) 3^1

   e) 3^0

   f) 3^{-4}

5.

   -1

6.

    a) False

    b) False

    c) False

    d) True

    e) True

    f) False

7.

    a) 6^{-1}

    b) 2^{-1}

    c) 20^{-1}

    d) $100^{-1} = 10^{-2}$

    e) $4^{-2} = 2^{-4}$

    f) 5^{-3}

8.

    a) $\frac{1}{25}$

    b) $\frac{1}{512}$

11.

10^{-3}

$\dfrac{1}{10\ 000} = 10^{-4}$

$\dfrac{1}{100\ 000} = 10^{-5}$

12. Leave your answer in positive index form.

a) $5^{-2} = \dfrac{1}{5^2}$

b) $4^{-9} = \dfrac{1}{4^9}$

c) $2^{-6} = \dfrac{1}{2^6}$

d) $9^{-3} = \dfrac{1}{9^3}$

e) $6^{-6} = \dfrac{1}{6^6}$

f) $12^{-20} = \dfrac{1}{12^{20}}$

g) $11^{-3} = \dfrac{1}{11^3}$

h) $3^{-8} = \dfrac{1}{3^8}$

i) $7^{-6} = \dfrac{1}{7^6}$

j) 2^4

Exercise 1

8. Leave your answer in positive index form.

a) 5^7

b) 8^6

c) $3^{-5} = \dfrac{1}{3^5}$

d) 4^{13}

e) $4^{-3} = \dfrac{1}{4^3}$

f) $6^{-5} = \dfrac{1}{6^5}$

g) $8^{-3} = \dfrac{1}{8^3}$

h) $9^{-12} = \dfrac{1}{9^{12}}$

i) 1

j) 6

k) 1

Homework Book

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2.

a) 2^{12}

b) $2^3 \times 3^2 \times 5^5$

c) 2^3

d) 10^3

e) $6y^2$

f) $5t^3x$

6.

a) 2

b) 4

c) -6

d) 5

e) 2

f) 3

7. Write as a fraction in its simplest form.

a) $\frac{1}{125}$

b) $\frac{8}{1}$

c) $\frac{9}{1}$

d) $\frac{3}{1}$

e) $\frac{125}{8} = 15 \frac{5}{8}$

f) $\frac{16}{1}$