

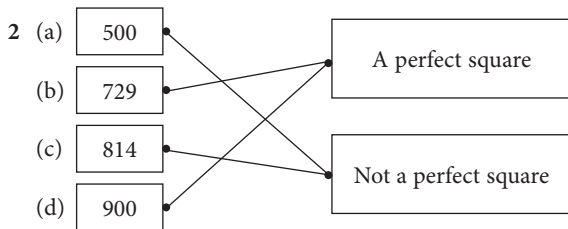
Fully-worked Solutions

Practice 3

Formative Practice

- 1 A True
B False
C False
D False

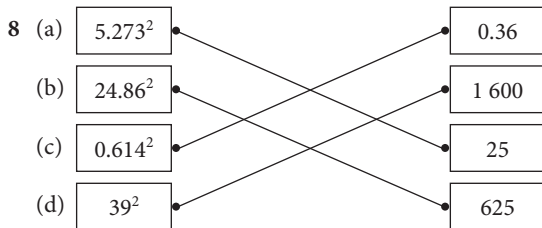
Answer: A



- 3 $36 = 6^2$
 $144 = 12^2$
 $225 = 15^2$
 $324 = 18^2$

Answer: A

- 4 (a) 2.6 (b) 0.038
(c) 11.9025 (d) 198.81
- 5 (a) 43 681 (b) 66.5856
(c) 174.24 (d) $17\frac{13}{36}$
- 6 (a) 2 (b) 0.6
(c) $\frac{5}{7}$ (d) $2\frac{2}{3}$
- 7 (a) 4.123 (b) 0.097
(c) 0.828 (d) 2.708



- 9 (a) $3 < 3.14 < 4$
 $3^2 < 3.14^2 < 4^2$
 $9 < 3.14^2 < 16$
- (b) $0.2 < 0.27 < 0.3$
 $0.2^2 < 0.27^2 < 0.3^2$
 $0.04 < 0.27^2 < 0.09$
- (c) $16 < 16.053 < 17$
 $16^2 < 16.053^2 < 17^2$
 $256 < 16.053^2 < 289$

(d) $45 < 45.3 < 46$
 $45^2 < 45.3^2 < 46^2$
 $2\ 025 < 45.3^2 < 2\ 116$

- 10 (a) $48 \approx 49$ (b) $\frac{9.15}{\sqrt{9.15}} \approx \frac{9}{\sqrt{9}}$
 $\sqrt{48} \approx \sqrt{49}$ ≈ 3
 ≈ 7
- (c) $143 \approx 144$ (d) $\frac{0.652}{\sqrt{0.652}} \approx \frac{0.64}{\sqrt{0.64}}$
 $\sqrt{143} \approx \sqrt{144}$ ≈ 0.8
 ≈ 12

- 11 (a) $4 < 4.97 < 9$
 $2 < \sqrt{4.97} < 3$
- (b) $169 < 172 < 196$
 $13 < \sqrt{172} < 14$
- (c) $0.04 < 0.069 < 0.09$
 $0.2 < \sqrt{0.069} < 0.3$

- 12 (a) $\sqrt{\frac{5}{8}} \times \sqrt{\frac{5}{8}} = \frac{5}{8}$
- (b) $\sqrt{40} \times \sqrt{10} = \sqrt{40 \times 10}$
 $= \sqrt{400}$
 $= 20$

- 13 $8 = 2^3$
 $27 = 3^3$
 $64 = 4^3$
 $81 = 9^2 = 3^4$

Answer: D

- 14 (a) (i)
$$\begin{array}{r} 2 \overline{) 50} \\ \underline{40} \\ 10 \\ \underline{10} \\ 0 \end{array}$$

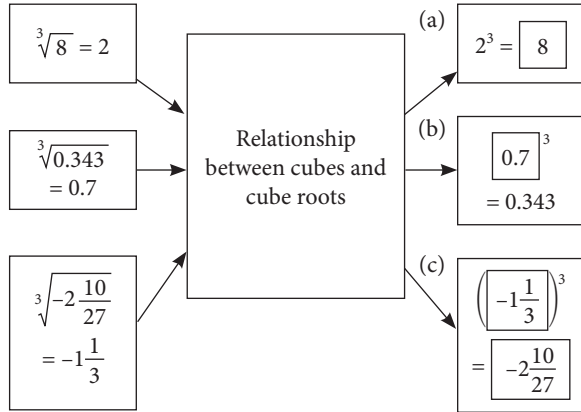
 $50 = 2 \times 5 \times 5$
- (ii)
$$\begin{array}{r} 2 \overline{) 216} \\ \underline{40} \\ 216 \\ \underline{408} \\ 216 \\ \underline{432} \\ 216 \\ \underline{432} \\ 0 \end{array}$$

 $216 = 6 \times 6 \times 6$

- (b) (i) $50 \neq 5^3$
50 is not a perfect cube.
- (ii) $216 = 6^3$
216 is a perfect cube.

- 15 (a) $\sqrt[3]{27} = 3$
- (b) $1.3^3 = 2.197$
- (c) $\sqrt[3]{-1\frac{61}{64}} = -1\frac{1}{4}$

16



17 (a) $5^3 = 5 \times 5 \times 5$
 $= 25 \times 5$
 $= 125$

(b) $0.8^3 = 0.8 \times 0.8 \times 0.8$
 $= 0.64 \times 0.8$
 $= 0.512$

(c) $\left(-1\frac{1}{2}\right)^3 = \left(-1\frac{1}{2}\right) \times \left(-1\frac{1}{2}\right) \times \left(-1\frac{1}{2}\right)$
 $= \left(-\frac{3}{2}\right) \times \left(-\frac{3}{2}\right) \times \left(-\frac{3}{2}\right)$
 $= \frac{9}{4} \times \left(-\frac{3}{2}\right)$
 $= -\frac{27}{8}$
 $= -3\frac{3}{8}$

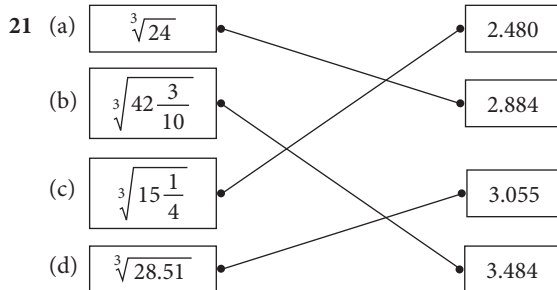
18 (a) $33^3 = 35\,937$ (b) $(-6.8)^3 = -314.432$

(c) $\left(2\frac{2}{3}\right)^3 = 18\frac{26}{27}$ (d) $\left(-3\frac{1}{2}\right)^3 = -42\frac{7}{8}$

19 (a) $\sqrt[3]{1\,000} = \sqrt[3]{10^3} = 10$

(b) $\sqrt[3]{-0.008} = \sqrt[3]{(-0.2)^3} = -0.2$

20 $\sqrt[3]{15\frac{5}{8}} = \sqrt[3]{\frac{125}{8}}$
 $= \sqrt[3]{\left(\frac{5}{2}\right)^3}$
 $= \frac{5}{2}$
 $= 2\frac{1}{2}$



22 (a) $2.7^3 \approx 3^3$
 ≈ 27

(b) $(-5.3)^3 \approx (-5)^3$
 ≈ -125

(c) $9.68^3 \approx 10^3$
 $\approx 1\,000$

23 (a) $\sqrt[3]{9} \approx \sqrt[3]{8}$

(b) $\sqrt[3]{-65} \approx \sqrt[3]{-64}$

(c) $\sqrt[3]{200} \approx \sqrt[3]{216}$

24 (a) $4 < 4.1 < 5$
 $64 < 4.1^3 < 125$

(c) $1 < 6 < 8$
 $1 < \sqrt[3]{6} < 2$

(b) $-2 < -1.81 < -1$
 $-8 < (-1.81)^3 < -1$

(d) $-64 < -42.1 < -27$
 $-4 < \sqrt[3]{-42.1} < -3$

25 $a^3 = 3\frac{3}{8}$

$a = \sqrt[3]{3\frac{3}{8}}$
 $= \sqrt[3]{\frac{27}{8}}$
 $= \sqrt[3]{\left(\frac{3}{2}\right)^3}$
 $= \frac{3}{2}$

$b = \frac{3}{2} + 1 = \frac{5}{2}$

Volume of cube B
 $= b^3$
 $= \left(\frac{5}{2}\right)^3$
 $= \frac{125}{8}$
 $= 15\frac{5}{8}$

26 (a) $(-7)^2 + 2^3 = 49 + 8$
 $= 57$

(b) $\sqrt{25} \times \sqrt[3]{1\,000} = 5 \times 10$
 $= 50$

(c) $(13 - \sqrt{121})^3 = (13 - 11)^3$
 $= 2^3$
 $= 8$

(d) $3 \times \left(\frac{1}{\sqrt{2}}\right)^3 + \sqrt{2\frac{7}{9}} \div \sqrt[3]{-8} = 3 \times \frac{1}{2} + \sqrt{\frac{25}{9}} \div (-2)$
 $= \frac{3}{2} + \frac{5}{3} \times \frac{1}{-2}$
 $= \frac{3}{2} - \frac{5}{6}$
 $= \frac{9-5}{6}$
 $= \frac{4}{6}$
 $= \frac{2}{3}$

Summative Practice

1 $225 = 15^2$

$289 = 17^2$

$729 = 27^2$

Answer: C

2 $\sqrt{4\frac{25}{36}} = \sqrt{\frac{169}{36}}$
 $= \frac{13}{6}$
 $= 2\frac{1}{6}$

Answer: B

$$\begin{aligned} 3 \quad 5.5^3 &= 5.5^2 \times 5.5 \\ &= 30 \times 5.5 \\ &= 165 \end{aligned}$$

Answer: **B**

$$\begin{aligned} 4 \quad 4^2 - \sqrt[3]{-125} &= 16 - (-5) \\ &= 16 + 5 \\ &= 21 \end{aligned}$$

Answer: **C**

$$\begin{aligned} 5 \quad \left(2\frac{1}{2}\right)^2 - 1\frac{5}{8} &= \left(\frac{5}{2}\right)^2 - \frac{13}{8} \\ &= \frac{25}{4} - \frac{13}{8} \\ &= \frac{50 - 13}{8} \\ &= \frac{37}{8} \\ &= 4\frac{5}{8} \end{aligned}$$

Answer: **D**

$$6 \quad (a) \sqrt[3]{9.3} - \sqrt{1.44} = 2.1 - 1.2 = 0.9$$

$$(b) (2.1^3 + 6.7)^2 = (9.3 + 6.7)^2 = 16^2 = 256$$

$$7 \quad (a) 6.8^2 = 46.24$$

$$(b) 6.8^3 + 3.2 \times 6.8^2 = 6.8^2 \times (6.8 + 3.2) = 46.24 \times 10 = 462.4$$

$$8 \quad 15 \times 0.85^2 - \sqrt{4.54} = 15 \times 0.7225 - 2.13 = 10.9375 - 2.13 = 8.8075$$

9 (a) Perfect squares:

121, 144, 169, 196, 225, 256, 289

Perfect cubes:

125, 216

$$(b) (i) \sqrt[3]{123} \approx \sqrt[3]{125}$$

$$\begin{aligned} &\approx 5 \\ (ii) \sqrt[3]{-50} &\approx \sqrt[3]{-64} \\ &\approx -4 \end{aligned}$$

$$10 \quad (a) 5^2 \times 4^3 = 25 \times 64 = 1600$$

$$\begin{aligned} (b) \sqrt{400} - \sqrt[3]{\frac{8}{125}} &= 20 - \frac{2}{5} \\ &= \frac{100 - 2}{5} \\ &= \frac{98}{5} \\ &= 19\frac{3}{5} \end{aligned}$$

$$11 \quad (a) (1.6 - \sqrt[3]{-27})^2 = (1.6 + 3)^2 = 4.6^2 = 21.16$$

$$\begin{aligned} (b) \sqrt{7} \times \sqrt{28} - \sqrt{3.4} \times \sqrt{3.4} &= \sqrt{196} - 3.4 \\ &= 14 - 3.4 \\ &= 10.6 \end{aligned}$$

$$\begin{aligned} 12 \quad \left(\frac{2}{5}\right)^3 \times \sqrt{\frac{4}{9}} + \left(\frac{2}{5}\right)^3 \times \sqrt[3]{\frac{1}{216}} &= \left(\frac{2}{5}\right)^3 \left(\sqrt{\frac{4}{9}} + \sqrt[3]{\frac{1}{216}}\right) \\ &= \frac{8}{125} \left(\frac{2}{3} + \frac{1}{6}\right) \\ &= \frac{8}{125} \times \frac{4+1}{6} \\ &= \frac{8}{125} \times \frac{5}{6} \\ &= \frac{4}{75} \end{aligned}$$

13 Area of the shaded region

$$\begin{aligned} &= 12^2 - 4^2 - 6^2 \\ &= 144 - 16 - 36 \\ &= 92 \text{ cm}^2 \end{aligned}$$