

1 Squares and square roots ☐

- a) Work out $\sqrt{1.44} + 0.2^2$
b) $(x-3)^2 = 64$. Find both values of x .

a) $1.2 + 0.04$
b) $x - 3 = 8$ or $x - 3 = -8$
a) 1.24 b) $x = 11$ or $x = -5$

2 Cubes and cube roots ☐

- a) Work out 0.3^3 and $\sqrt[3]{0.064}$
b) Eight cubes, each with a volume of 27 cm^3 , are put together to make one larger cube. Work out the edge length of the larger cube.

a) 0.027 and 0.4
b) $8 \times 27 = 216 \text{ cm}^3$, $\sqrt[3]{216}$
b) 6 cm

3 Estimating roots ☐

- a) $\sqrt{n}$ is between 8 and 9, and n is a multiple of 7. Find both values of n .
b) Estimate $\sqrt[3]{130}$ to 1 decimal place.

a) $64 < n < 81$
b) $5^3 = 125$, a little over 5
a) 70 and 77 b) 5.1

4 Index laws ☐

- a) Simplify $(5x^2y^3)^2$
b) Simplify $\frac{18x^6y^2}{6x^2y^5}$

a) $25x^4y^6$
b) $3x^4y^{-3}$
b) $\frac{3x^4}{y^3}$

5 Fractional indices ☐

- a) Work out $1000^{\frac{2}{3}}$
b) Work out $\left(\frac{4}{9}\right)^{-\frac{1}{2}}$

a) $\sqrt[3]{1000} = 10$, 10^2
b) $\sqrt{\frac{4}{9}} = \frac{2}{3}$, then flip
a) 100 b) $\frac{3}{2}$

Indices, standard form and surds revision mat answers

6 Simplifying surds ☐

- a) Simplify $\sqrt{98} + \sqrt{50}$
b) Expand and simplify $\sqrt{3}(\sqrt{12} + 5)$

a) $7\sqrt{2} + 5\sqrt{2}$
b) $\sqrt{36} + 5\sqrt{3}$
a) $12\sqrt{2}$ b) $6 + 5\sqrt{3}$

7 Rationalising denominators ☐

- a) Rationalise the denominator of $\frac{15}{\sqrt{5}}$
b) Rationalise the denominator of $\frac{2+\sqrt{3}}{\sqrt{3}}$

a) $\frac{15\sqrt{5}}{5}$
b) $\frac{(2+\sqrt{3})\sqrt{3}}{3}$
a) $3\sqrt{5}$ b) $\frac{2\sqrt{3}+3}{3}$

8 Standard form (large) ☐

- a) Write 7.03×10^5 as an ordinary number.
b) How many times bigger is 6×10^9 than 2×10^6 ?

a) 703 000
b) $6 \div 2 = 3$, $10^9 \div 10^6 = 10^3$
b) 3000 times (3×10^3)

9 Standard form (small) ☐

- a) Write 6.2×10^{-3} as an ordinary number.
b) Which is bigger, 4×10^{-5} or 0.0003? How many times bigger is it?

a) 0.0062
b) $0.0003 = 3 \times 10^{-4} = 30 \times 10^{-5}$
b) 0.0003, $30 \div 4 = 7.5$ times

10 Standard form calculations ☐

Give your answers in standard form.

- a) Work out $(6 \times 10^5) \div (1.5 \times 10^{-2})$
b) Work out $3.4 \times 10^6 + 5.8 \times 10^5$

a) $6 \div 1.5 = 4$, $10^5 - (-2)$
b) $3.4 \times 10^6 + 0.58 \times 10^6$
a) 4×10^7 b) 3.98×10^6