

Exercise walk-through

1.2.4

Ratio Parts

AQA · GCSE · Mathematics

40. Indices, surds and standard form · Higher

Indices, surds and standard form · Higher

$0.000072 = 7.2 \times 10^{-5}$. Also $16^{(3/4)} = (16^{(1/4)})^3 = 2^3 = 8$. Simplify $\sqrt{72} = 6\sqrt{2}$, then rationalise $1/\sqrt{2} = \sqrt{2}/2$. Useful powers include $3^3 = 27$, $4^3 = 64$, $5^3 = 125$, $15^2 = 225$ and $10^6 = 1,000,000$. Integer laws give $2^0 = 1$, $2^{-3} = 1/8$ and $(2^3)^2 = 2^6 = 64$. For standard-form multiplication, $(3 \times 10^5)(4 \times 10^{-3}) = 12 \times 10^2 = 1.2 \times 10^3$. Division gives $(6 \times 10^5)/(2 \times 10^2) = 3 \times 10^3$. For addition, first align exponents: $3 \times 10^4 + 2 \times 10^3 = 3.2 \times 10^4$. For a positive base, $a^{(m/n)} = (\text{the } n\text{th root of } a)^m$. Thus $27^{(2/3)} = 3^2 = 9$ and $16^{(-1/2)} = 1/4$.

53. Signed numbers, place value and operation order · Foundation

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The balance is $-12+35-9=14$ yuan. Also $-4-(-7)=3$ and $(-6)\times(-3)=18$. The reciprocal of -4 is $-1/4$, since their product is 1. For $18\div3\times2$, work left to right to obtain 12. In 3.047, the 4 means four hundredths and the 7 means seven thousandths. For decimal multiplication, first calculate 24×35 : $24\times30+24\times5=720+120=840$. The original 2.4×0.35 has three decimal places in total, giving 0.840. For $5.04\div0.12$ multiply both numbers by 100 to get $504\div12$; $12\times40=480$ leaves 24, so the answer is 42. To order negative fractions, $-3/4=-0.75$ and $-4/5=-0.8$, hence $-4/5<-3/4$.

60. Exact fractions and mixed-number operations · Foundation

Exact fractions and mixed-number operations · Foundation

$1\frac{1}{2} - \frac{3}{4} = \frac{6}{4} - \frac{3}{4} = \frac{3}{4}$. Also $(-\frac{2}{3}) \times (\frac{9}{4}) = -\frac{18}{12} = -\frac{3}{2}$ and $(\frac{3}{4}) \div (\frac{5}{8}) = (\frac{3}{4}) \times (\frac{8}{5}) = \frac{6}{5}$. A common denominator gives $\frac{5}{6} + \frac{3}{4} = \frac{10}{12} + \frac{9}{12} = \frac{19}{12}$. Check division by multiplying $\frac{6}{5}$ by $\frac{5}{8}$ to recover $\frac{3}{4}$. Exact multiples of π follow ordinary arithmetic: $3\pi + 2\pi = 5\pi$ and $6\pi/3 = 2\pi$. Leave an answer such as 5π exact when requested; $\pi \approx 3.14$ would introduce approximation. For subtraction, $\frac{5}{6} - \frac{3}{4} = \frac{10}{12} - \frac{9}{12} = \frac{1}{12}$; for a negative mixed number, $-1\frac{1}{2}$ means $-(1 + \frac{1}{2}) = -\frac{3}{2}$.

Exercises 2.1·2.3

2.1 (Foundation) Find the smaller share of 84 in ratio 2:5.

2.2 (Foundation) Find $\frac{3}{4}$ of 28.

2.3 (Foundation) Find 120% of 35.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find the smaller share of 84 in ratio 2:5.

2.1 There are 7 parts; $84/7 \times 2 = 24$.

2.2 (Foundation) Find $3/4$ of 28.

2.2 $28/4 \times 3 = 21$.

2.3 (Foundation) Find 120% of 35.

3 Exam-style questions

2.3 $120/100 \times 35 = 42$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: For a 2:5 division, the first share is always $\frac{2}{5}$ of the whole.

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3.1 False. The whole has $2+5=7$ parts. Dividing 700 gives first share $(\frac{2}{7}) \times 700 = 200$; $\frac{2}{5}$ of 700 would be 280.

Local review guidance: show the chosen method; give the checked result; explain the condition or failed shortcut. This is authored classroom guidance.