

Exercise walk-through

1.1.2

Signed Arithmetic

AQA · GCSE · Mathematics

29. Exact arithmetic and estimation · Higher

Exact arithmetic and estimation · Higher

$72=2^3 \times 3^2$ and $90=2 \times 3^2 \times 5$. Their HCF is $2 \times 9=18$. Make 18 bags with 4 pencils and 5 pens each. Their LCM is $2^3 \times 3^2 \times 5=360$. A prime integer is greater than 1 and has exactly two positive factors. The number 1 is not prime; a composite positive integer greater than 1 has more than two positive factors. Every integer greater than 1 has a unique product of prime factors apart from their order. For example, $60=2^2 \times 3 \times 5$. A factor divides a number; a multiple is the result of multiplying it by an integer. HCF uses common smallest powers, while LCM uses largest powers.

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

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$1\frac{1}{2} - \frac{3}{4} = \frac{6}{4} - \frac{3}{4} = \frac{3}{4}$. 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 $-12+35-9$.

2.2 (Foundation) Find $-4-(-7)$.

2.3 (Foundation) Evaluate $18\div 3\times 2$.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find $-12+35-9$.

2.1 $-12+35=23$, then $23-9=14$.

2.2 (Foundation) Find $-4-(-7)$.

2.2 Subtracting -7 adds 7 : $-4+7=3$.

2.3 (Foundation) Evaluate $18\div 3\times 2$.

3 Exam-style questions

2.3 Equal priority: $18\div 3=6$, then $6\times 2=12$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Multiplication must always be performed before division, even when division is farther left.

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3.1 False. Equal-priority multiplication and division proceed left to right: $18 \div 3 \times 2 = 6 \times 2 = 12$. Multiplying 3×2 first incorrectly gives 3.

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