

Exercise walk-through

1.1.4

Estimation

AQA · GCSE · Mathematics

24. Exact arithmetic and estimation · Foundation

Exact arithmetic and estimation · Foundation

$72=2^3 \times 3^2$ 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.

29. Exact arithmetic and estimation · Higher

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100. Estimation, rounding and simple error intervals · Foundation

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The calculation is about 96.18, consistent with the estimate 100. The number 0.004786 rounds to 0.0048 at 2 significant figures, but to 0.005 at 3 decimal places. If length L rounds to 8.0 cm at 1 decimal place, $7.95 \leq L < 8.05$. If a positive value is truncated to 8.0 at 1 decimal place, $8.0 \leq L < 8.1$ instead. Reported precision must fit the question. Seventeen items packed six per box need three whole boxes, since two boxes hold only twelve items. Rounding $17/6$ to two boxes would fail the physical requirement.

Exercises 2.1·2.3

2.1 (Foundation) Find the rough estimate $50 \times 20 \div 10$.

2.2 (Foundation) Round 0.004786 to 2 significant figures.

2.3 (Foundation) Find the upper endpoint of the nearest-0.1 interval for 8.0.

3 Exam-style questions

Exercises 2.1·2.3

2.1 (Foundation) Find the rough estimate $50 \times 20 \div 10$.

2.1 $50 \times 20 / 10 = 100$.

2.2 (Foundation) Round 0.004786 to 2 significant figures.

2.2 Start at digit 4; the next digit after 7 is 8, so round to 0.0048.

2.3 (Foundation) Find the upper endpoint of the nearest-0.1 interval for 8.0.

3 Exam-style questions

2.3 Half of 0.1 is 0.05; $8.0 + 0.05 = 8.05$.

Exercise 3.1

3.1 Decide whether this claim is true. Justify with a concrete calculation or counterexample: Rounding a positive value and truncating it to the same decimal place always give the same error interval.

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3.1 False. Rounding to 3.6 at one decimal gives $3.55 \leq x < 3.65$ under the usual rounding convention. Truncating a positive value to 3.6 gives $3.6 \leq x < 3.7$.

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