

Fractions, Decimals, Perimeter & 24-Hour Time

Topic: Equivalent Fractions, Perimeter & 12/24-Hour Clocks | Time Allowed: 45 Minutes | Total Marks: 35

Candidate Name: _____ Date: _____ Score: _____

1. CORE MATHEMATICAL CONCEPTS & RULES

- Equivalent fractions represent the same amount: multiply or divide both numerator and denominator by the same number (e.g. $\frac{2}{3} = \frac{4}{6} = \frac{8}{12}$).
- Adding/Subtracting like fractions: add/subtract numerators, leave denominator unchanged: $\frac{3}{8} + \frac{2}{8} = \frac{5}{8}$.
- Perimeter is the total distance around the outside of a 2D shape. For a rectangle: Perimeter = $2 \times (\text{Length} + \text{Width})$.
- 24-Hour Time: To convert afternoon/evening times (PM), add 12 to the hours (e.g. 4:35 PM = 16:35).

2. STEP-BY-STEP EXAMINER WORKED EXAMPLE: FINDING THE PERIMETER AND MISSING LENGTH OF A

Problem: A rectangular playground has a perimeter of 48 metres. Its length is 16 metres. What is its width?

Method & Steps:

1. Formula: Perimeter = $2 \times \text{Length} + 2 \times \text{Width}$.
2. Two lengths = $16 \text{ m} \times 2 = 32 \text{ m}$.
3. Remaining distance for two widths = $48 \text{ m} - 32 \text{ m} = 16 \text{ m}$.
4. One width = $16 \text{ m} \div 2 = 8 \text{ m}$.
5. Check: $16 + 8 + 16 + 8 = 48 \text{ m}$.

Final Solution: 8 metres

3. 11+ EXAM TECHNIQUE & SPEED CALCULATION STRATEGIES

1. Always show full written working: examiners award partial method marks even if arithmetic slips occur.
2. Estimate your answer before calculating to check if your final magnitude makes realistic sense.
3. Watch units carefully (e.g. converting cm to m, millilitres to litres, hours to minutes).
4. In timed exam conditions, spend ~1 minute per mark and flag difficult problems for the end.
5. Specialist 1-to-1 Maths & Science tuition available: www.themathsandsciencetutor.co.uk

Section A: Practice Exercises & Exam Questions

Show all calculations clearly. Write your final answer in the box. Total: 20 Marks

[FLUENCY]

Question 1: Equivalent Fractions

[2 marks]

Complete the equivalents: $\frac{3}{5} = \frac{\quad}{20} = \frac{18}{\quad}$

Answer / Working:

[FLUENCY]

Question 2: Fraction Addition

[2 marks]

Calculate: $\frac{5}{12} + \frac{4}{12} - \frac{2}{12}$. Give your answer in its simplest form.

Answer / Working:

[FLUENCY]

Question 3: 24-Hour Time

[2 marks]

A train departs at 14:45 and arrives at 17:10. How long did the journey take in hours and minutes?

Answer / Working:

[REASONING]

Question 4: Perimeter Comparison

[3 marks]

Shape A is a square with side length 7 cm. Shape B is a rectangle with length 9 cm and width 5 cm. Which shape has the greater perimeter? Show working.

Answer / Working:

[WORD PROB]

Question 5: Baking Fractions

[3 marks]

A baker has a 600g bag of flour. She uses $\frac{2}{5}$ of the flour to bake bread and $\frac{1}{3}$ of the total flour to bake muffins. How many grams of flour are left in the bag?

Answer / Working:

[REASONING]

Question 6: Decimals & Fractions

[3 marks]

Match each decimal to its fraction equivalent in lowest terms: 0.25, 0.6, 0.05, 0.75.

Answer / Working:

Section B: 11+ Grammar & Independent School Challenges

Advanced multi-step reasoning problems from top UK selective entrance exams.

CHALLENGE 1: THE RECTANGULAR GARDEN FENCE CHALLENGE [3 MARKS]

A gardener has 36 metres of fencing to enclose a rectangular plot against a brick wall (the wall forms one of the long sides, so only 3 sides need fencing).
If the width is 8 metres, calculate the area of the enclosed garden in square metres.

Final Answer:

CHALLENGE 2: FRACTION OF A TANK PROBLEM [3 MARKS]

A water barrel is $\frac{3}{8}$ full. When 35 litres of water are added, the barrel becomes $\frac{7}{8}$ full.
Calculate the total capacity of the water barrel when completely full.

Final Answer:

ROUGH WORKING / TRIAL & IMPROVEMENT SPACE

Section C: Examiner Mark Scheme & Method Solutions

Step-by-step methods, mark allocations, and alternative approaches.

Question 1 [Fluency]

Answer: $3/5 = 12/20 = 18/30$

Method: Multiply top & bottom by 4 to get 12/20; multiply original 3/5 by 6 to get 18/30.

Question 2 [Fluency]

Answer: $7/12$

Method: $5/12 + 4/12 = 9/12$. Then $9/12 - 2/12 = 7/12$.

Question 3 [Fluency]

Answer: 2 hours and 25 minutes

Method: From 14:45 to 15:00 = 15 mins; 15:00 to 17:00 = 2 hours; 17:00 to 17:10 = 10 mins. Total = 2h 25m.

Question 4 [Reasoning]

Answer: Both have equal perimeters (28 cm)

Method: Square A perimeter = $4 \times 7 = 28$ cm. Rectangle B perimeter = $2 \times (9 + 5) = 28$ cm.

Question 5 [Word Prob]

Answer: 160 grams remaining

Method: Bread uses $2/5$ of 600 = 240g. Muffins use $1/3$ of 600 = 200g. Total used = 440g. Left = $600 - 440 = 160$ g.

Question 6 [Reasoning]

Answer: $0.25 = 1/4$ | $0.6 = 3/5$ | $0.05 = 1/20$ | $0.75 = 3/4$

Method: Convert decimals to fractions over 100 and simplify: $25/100=1/4$, $60/100=3/5$, $5/100=1/20$, $75/100=3/4$.

EXPERT 1-TO-1 TUITION WITH FIARAZ IQBAL

Looking for top grammar school or independent school entrance (QE Boys, Henrietta Barnett, Latymer, King's)?

- Over 30 years of classroom teaching & senior school leadership experience (Former Headteacher).
- Proven track record preparing students for 11+ GL Assessment, CSSE, ISEB, and CEM exams.
- Specialist tuition in 11+ Mathematics, English Comprehension, Creative Writing, and Verbal Reasoning.
- Live online 1-to-1 lessons available across the UK and internationally (Singapore, Hong Kong, Dubai).

WhatsApp: +44 7760 257814 | Website: www.themathsandsciencetutor.co.uk

Book your free 30-minute diagnostic consultation today.