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Ratio, Rate and Proportion

Student Worksheet

Questions & Working Space

IGCSE Mathematics

Name: _____

Date: _____

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Note

How to use this worksheet. These questions are built *strictly* on the *Ratio, Rate and Proportion* notes: simplifying ratios, dividing a quantity in a given ratio, rates and unit rates, speed–distance–time, distance–time and velocity–time graphs, direct proportion (including $y \propto x^2$, x^3 and $\sqrt{x}$), inverse proportion, percentage as a proportion, and map scales.
Working space. Ruled lines are provided after each question — show *all* of your working there. Convert to a common unit *before* writing a ratio, state whether a problem is direct or inverse proportion before you solve it, and always show the step where you find the constant k. Harder questions have a teal **Hint** box; try the question first and use the hint only if you are stuck.
Graphs. Read values from the axes carefully. On a distance–time graph the gradient is the speed; on a velocity–time graph the gradient is the acceleration and the *area* underneath is the distance travelled.
Checking your answers. Full step-by-step solutions, a marking scheme for the exam paper, and a quick answer key are in the separate booklet *"Ratio, Rate and Proportion — Solutions & Answer Key."* Try each question honestly before you look.

1 Part I — Topic-by-Topic Exercises

1.1 Simplifying Ratios

Exercise S1 *[Basic]*

Simplify the ratio 42 : 56.

Exercise S2 *[Basic]*

Simplify the ratio 45 : 75.

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Exercise S3 *[Standard]*

Simplify the ratio 18 : 30 : 48.

Exercise S4 *[Standard]*

Simplify the ratio 2.4 : 0.6.

Exercise S5 *[Standard]*

Simplify the ratio 0.35 : 1.4.

Hint

Multiply *both* parts by the same power of 10 — enough to clear the decimal with the most decimal places.

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Exercise S6 *[Intermediate]*

Simplify the ratio $\frac{2}{3} : \frac{5}{6}$.

Exercise S7 *[Intermediate]*

Simplify the ratio $\frac{3}{5} : \frac{7}{10} : \frac{1}{2}$.

Hint

Multiply every part by the LCM of the denominators 5, 10 and 2.

Exercise S8 *[Advanced]*

Write the ratio of 750 g to 1.8 kg in its simplest form.

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Exercise S9 *[Advanced]*

Write the ratio of 45 minutes to 3 hours in its simplest form.

Exercise S10 *[Challenge]*

Write the ratio 1.25 : 2 in the form $1 : n$.

Hint

To make the first part equal to 1, divide *both* parts by 1.25. The answer does not have to be a whole number.

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1.2 Dividing a Quantity in a Given Ratio

Exercise B1 *[Basic]*

Share \$360 in the ratio 4 : 5.

Exercise B2 *[Basic]*

Divide 288 g in the ratio 5 : 7.

Exercise B3 *[Standard]*

Divide 540 ml in the ratio 2 : 3 : 4.

Exercise B4 *[Standard]*

Three cousins share £1260 in the ratio 3 : 4 : 5. Find how much each cousin receives.

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Exercise B5 *[Standard]*

A concrete mix uses cement and sand in the ratio $2 : 7$. A builder uses $84\,\text{kg}$ of sand.

(a) Find the mass of cement needed.

(b) Find the total mass of the mix.

Exercise B6 *[Intermediate]*

In a swimming club the ratio of boys to girls is $7 : 9$. There are 26 more girls than boys.

(a) Find the number of boys and the number of girls.

(b) Find the total membership of the club.

Hint

The *difference* between the two shares is $9 - 7 = 2$ parts, and that difference is worth 26 members.

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