

Name _____

Date _____

12.1 Understanding ratio — worksheet

Write and simplify ratios, find equivalent ratios, and connect a ratio to the fractions of the whole. · 53 questions · Show your working.

Remember

- A **ratio** compares amounts **part with part**: 3 : 2 means 3 of one for every 2 of the other.
- **Order matters**. 3 : 2 is not the same as 2 : 3.
- To **simplify**, divide every part by their highest common factor — exactly like a fraction.
- To find an **equivalent** ratio, multiply or divide every part by the same number.
- Before writing a ratio of two measurements, put them in the **same units**: 40 cm : 1 m becomes 40 : 100 = 2 : 5.
- A **fraction** compares part with **whole**. In 2 : 3 the first share is $\frac{2}{5}$ of the whole, not $\frac{2}{3}$.
- The total number of parts is the sum of the ratio: 2 : 3 has 5 parts.
- That confusion between $\frac{2}{3}$ and $\frac{2}{5}$ is the commonest error in the whole unit.

A · Fluency — Simplify, scale and convert to fractions.

- 1 Write the ratio **4 : 6** in its simplest form.

- 2 Write the ratio **10 : 15** in its simplest form.

- 3 Write the ratio **12 : 18** in its simplest form.

- 4 Write the ratio **8 : 20** in its simplest form.

- 5 Write the ratio **14 : 21** in its simplest form.

- 6 Write the ratio **9 : 24** in its simplest form.

- 7 Write the ratio **16 : 40** in its simplest form.

- 8 Write the ratio **25 : 35** in its simplest form.

- 9 Write the ratio **18 : 27** in its simplest form.

- 10 Write the ratio **30 : 45** in its simplest form.

- 11 Write the ratio **6 : 8** in its simplest form.

- 12 Write the ratio **20 : 50** in its simplest form.

- 13** Write the ratio **4 : 6 : 8** in its simplest form.
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- 14** Write the ratio **10 : 15 : 25** in its simplest form.
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- 15** Write the ratio **12 : 18 : 30** in its simplest form.
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- 16** Write the ratio **9 : 6 : 15** in its simplest form.
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- 17** Write the ratio **20 : 30 : 50** in its simplest form.
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- 18** The ratio 2 : 3 is equivalent to 8 : ?. What is the missing number?
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- 19** The ratio 3 : 5 is equivalent to 9 : ?. What is the missing number?
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- 20** The ratio 1 : 4 is equivalent to 7 : ?. What is the missing number?
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- 21** The ratio 5 : 2 is equivalent to 30 : ?. What is the missing number?
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- 22** The ratio 3 : 7 is equivalent to 15 : ?. What is the missing number?
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- 23** The ratio 4 : 9 is equivalent to 8 : ?. What is the missing number?
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- 24** The ratio 7 : 3 is equivalent to 28 : ?. What is the missing number?
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- 25** The ratio 2 : 5 is equivalent to 16 : ?. What is the missing number?
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- 26** In the ratio **2 : 3**, what fraction of the whole is the first part?
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- 27** In the ratio **1 : 4**, what fraction of the whole is the first part?
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- 28** In the ratio **3 : 5**, what fraction of the whole is the first part?
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- 29** In the ratio **5 : 2**, what fraction of the whole is the first part?
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- 30** In the ratio **3 : 7**, what fraction of the whole is the first part?
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- 31** In the ratio **4 : 5**, what fraction of the whole is the first part?
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B · Reasoning — What a ratio does and does not say.

- 32** What does the ratio 3 : 2 mean?
- ☐ 3 more than 2
 - ☐ For every 3 of the first there are 2 of the second
 - ☐ 3 out of 2
 - ☐ 3 divided by 2 parts

- 33** How do you simplify a ratio?
- ☐ Subtract the smaller from the larger
 - ☐ Divide every part by their highest common factor
 - ☐ Add the parts
 - ☐ Multiply the parts
- 34** Does the order of a ratio matter?
- ☐ No
 - ☐ Yes — $3 : 2$ is not the same as $2 : 3$
 - ☐ Only for large numbers
 - ☐ Only in word problems
- 35** In the ratio $2 : 3$, what fraction of the whole is the first part?
- ☐ $\frac{2}{3}$
 - ☐ $\frac{2}{5}$
 - ☐ $\frac{3}{5}$
 - ☐ $\frac{1}{2}$
- 36** What is the difference between a ratio and a fraction?
- ☐ Nothing
 - ☐ A ratio compares part with part; a fraction compares part with whole
 - ☐ A fraction is bigger
 - ☐ A ratio uses a colon
- 37** Is $6 : 9$ the same ratio as $2 : 3$?
- ☐ Yes
 - ☐ No
- 38** Is $4 : 6$ the same ratio as $6 : 4$?
- ☐ Yes
 - ☐ No
- 39** Two lengths are in the ratio $1 : 4$. What can you say?
- ☐ They are equal
 - ☐ The second is four times the first
 - ☐ The second is 4 more
 - ☐ The first is four times the second

C · Challenge — Units, three parts and missing values.

- 40** Simplify the ratio $45 : 60 : 75$.
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- 41** A ratio $3 : 5$ is equivalent to $21 : n$. What is n ?
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- 42** A ratio $a : 8$ simplifies to $3 : 4$. What is a ?
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- 43** Write $40 \text{ cm} : 1 \text{ m}$ as a ratio in its simplest form.
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44 Write 30 minutes : 2 hours as a ratio in its simplest form.

45 In the ratio 3 : 7, what fraction of the whole is the second part?

D · Word problems — Recipes, mixtures and maps.

46 A recipe uses 200 g of flour and 300 g of sugar. Write the ratio in its simplest form.

47 A class has 12 boys and 18 girls. Write the ratio of boys to girls in its simplest form.

48 A drink mixes 50 ml of syrup with 250 ml of water. Write the ratio in its simplest form.

49 Concrete mixes cement and sand in the ratio 1 : 4. For 3 kg of cement, how much sand is needed, in kg?

50 Paint mixes red and white in the ratio 2 : 5. For 6 litres of red, how much white, in litres?

51 A map scale is 1 : 50 000. How many cm on the ground is 1 cm on the map?

52 A class has boys and girls in the ratio 3 : 4. If there are 9 boys, how many girls?

53 A shop sells apples and pears in the ratio 5 : 2. If 40 apples are sold, how many pears?
