

Educational Worksheet

Grade 7 Mathematics Worksheet

Ratio and Direct Proportion

Name: _____ Date: _____ Class: _____

Learning Objectives

By the end of this worksheet, you will be able to: - Simplify ratios to their lowest terms - Find equivalent ratios - Share quantities in given ratios - Solve direct proportion problems using the unitary method - Apply ratio and proportion to real-world situations

Instructions

- Show all your working clearly
 - Simplify ratios where possible
 - Include correct units in your answers
 - Check that your answers make sense
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Section A: Simplifying Ratios (8 marks)

Simplify these ratios to their lowest terms:

1. $12 : 18 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

2. $15 : 25 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

3. $24 : 36 : 48 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

4. $20 : 35 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

5. $16 : 24 : 32 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

6. $45 : 60 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

7. $21 : 28 : 35 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

8. $72 : 108 = \underline{\hspace{1cm}} : \underline{\hspace{1cm}}$

Section B: Equivalent Ratios (6 marks)

Complete these equivalent ratios:

9. $3 : 5 = 12 : \underline{\hspace{1cm}}$

10. $2 : 7 = \underline{\hspace{2cm}} : 21$

11. $4 : 9 = 20 : \underline{\hspace{2cm}}$

12. $5 : 8 = \underline{\hspace{2cm}} : 32$

13. $6 : 11 = 18 : \underline{\hspace{2cm}}$

14. $7 : 10 = \underline{\hspace{2cm}} : 50$

Section C: Sharing in Given Ratios (10 marks)

Share these quantities in the given ratios:

15. Share £240 in the ratio 3 : 5 **Answer:** £ : £

16. Share 72 sweets in the ratio 5 : 7 **Answer:** :

17. Share 150 cm in the ratio 2 : 3 : 5 **Answer:** cm : cm : cm

18. Share £420 in the ratio 4 : 3 : 7 **Answer:** £ : £ : £

19. Share 96 books in the ratio 5 : 3 **Answer:** :

20. Share 210 minutes in the ratio 2 : 3 : 4 : 5 **Answer:** min : min : min : min

21. Share 180 kg in the ratio 7 : 5 **Answer:** kg : kg

22. Share £675 in the ratio 3 : 4 : 8 **Answer:** £ : £ : £

23. Share 144 marbles in the ratio 1 : 3 : 5 **Answer:** : :

24. Share 280 ml in the ratio 3 : 4 **Answer:** ml : ml

Section D: Direct Proportion (8 marks)

Solve these direct proportion problems:

25. If 5 pencils cost £3, how much do 8 pencils cost? **Answer:** £

26. If 12 oranges weigh 2.4 kg, how much do 20 oranges weigh? **Answer:** kg

27. If 6 workers can build a wall in 15 days, how long would it take 10 workers? **Answer:** days

28. If 4 meters of fabric cost £18, how much does 7 meters cost? **Answer:** £

29. If 9 identical books weigh 2.7 kg, what is the weight of 15 books? **Answer:** kg

30. If 8 tins of paint cover 120 m², how many tins are needed to cover 195 m²? **Answer:** tins

31. If £45 can be exchanged for \$60, how many dollars can £75 be exchanged for? **Answer:** \$

32. If a car travels 180 km in 2.5 hours, how far will it travel in 4 hours at the same speed? **Answer:** km

Section E: Real-World Applications (8 marks)

Apply ratio and proportion to these practical problems:

33. **Recipe Problem:** A recipe for 4 people needs 300g flour, 200g sugar, and 150g butter.

- How much of each ingredient is needed for 6 people?

Flour: _____ g **Sugar:** _____ g **Butter:** _____ g

34. **Paint Mixing:** Red and blue paint are mixed in the ratio 3 : 2 to make purple paint.

- How much red paint is needed if 8 litres of blue paint is used?
- How much purple paint will be made in total?

Red paint: _____ litres **Total purple paint:** _____ litres

35. **School Ratio:** In a school, the ratio of boys to girls is 4 : 5. There are 720 students in total.

- How many boys are there?
- How many girls are there?

Boys: _____ **Girls:** _____

36. **Speed and Distance:** A train travels at a constant speed. It covers 450 km in 3 hours.

- How far will it travel in 5 hours?
- How long will it take to travel 600 km?

Distance in 5 hours: _____ km **Time for 600 km:** _____ hours

37. **Currency Exchange:** £1 = \$1.40 and £1 = €1.20

- Convert £85 to dollars
- Convert £60 to euros
- If someone has \$210, how many pounds is this worth?

Dollars: \$_____ **Euros:** €_____ **Pounds:** £_____

38. **Profit Sharing:** Three business partners share profits in the ratio 2 : 3 : 4. The total profit is £18,000.

- How much does each partner receive?

Partner 1: £_____ **Partner 2:** £_____ **Partner 3:** £_____

39. **Map Scale Ratio:** On a map, 2 cm represents 5 km in real life.

- What is the ratio of the map scale?
- If two cities are 12 cm apart on the map, what is the real distance?

Scale ratio: _____ : _____ **Real distance:** _____ km

40. **Mixture Problem:** Coffee beans are mixed in the ratio Colombian : Brazilian : Ethiopian = 3 : 2 : 1.

- If 24 kg of Colombian beans are used, how much of each of the other types is needed?

- What is the total weight of the mixture?

Brazilian: _____ kg **Ethiopian:** _____ kg **Total:** _____ kg

Total: _____ / 40 marks

Self-Assessment

- I can simplify ratios: ☐ Confident ☐ Mostly ☐ Need practice
- I can find equivalent ratios: ☐ Confident ☐ Mostly ☐ Need practice
- I can share quantities in given ratios: ☐ Confident ☐ Mostly ☐ Need practice
- I can solve proportion problems: ☐ Confident ☐ Mostly ☐ Need practice

Key Methods to Remember

- **Simplifying ratios:** Divide all parts by their highest common factor
- **Sharing in ratios:** Find total parts, then calculate each share
- **Direct proportion:** If one quantity increases, the other increases proportionally
- **Unitary method:** Find the value of one unit, then multiply