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

Section A: Simplifying Ratios (8 marks)

Simplify these ratios to their lowest terms:

1. **12 : 18 = _____ : _____**

2. **15 : 25 = _____ : _____**

3. **24 : 36 : 48 = _____ : _____ : _____**

4. **20 : 35 = _____ : _____**

5. **16 : 24 : 32 = _____ : _____ : _____**

6. **45 : 60 = _____ : _____**

7. **21 : 28 : 35 = _____ : _____ : _____**

8. **72 : 108 = _____ : _____**

Section B: Equivalent Ratios (6 marks)

Complete these equivalent ratios:

9. **3 : 5 = 12 : _____**

10. **2 : 7 = _____ : 21**

11. **4 : 9 = 20 : _____**

12. **5 : 8 = _____ : 32**

13. **6 : 11 = 18 : _____**

14. **7 : 10 = _____ : 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

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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