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 <u>Answer: £</u>_____ : £_____**

16. **Share 72 sweets in the ratio 5 : 7 <u>Answer:</u> _____ : _____**

17. **Share 150 cm in the ratio 2 : 3 : 5 <u>Answer:</u> _____ cm : _____ cm : _____ cm**

18. **Share £420 in the ratio 4 : 3 : 7 <u>Answer: £</u>_____ : £_____ : £_____**

19. **Share 96 books in the ratio 5 : 3 <u>Answer:</u> _____ : _____**

20. **Share 210 minutes in the ratio 2 : 3 : 4 : 5 <u>Answer:</u> _____ min : _____ min : _____ min : _____ min**

21. **Share 180 kg in the ratio 7 : 5 <u>Answer:</u> _____ kg : _____ kg**

22. **Share £675 in the ratio 3 : 4 : 8 <u>Answer: £</u>_____ : £_____ : £_____**

23. **Share 144 marbles in the ratio 1 : 3 : 5 <u>Answer:</u> _____ : _____ : _____**

24. **Share 280 ml in the ratio 3 : 4 <u>Answer:</u> _____ 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? <u>Answer:</u> £_____**

26. **If 12 oranges weigh 2.4 kg, how much do 20 oranges weigh? <u>Answer:</u> _____ kg**

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

28. **If 4 meters of fabric cost £18, how much does 7 meters cost? <u>Answer:</u> £_____**

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

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

31. **If £45 can be exchanged for $60, how many dollars can £75 be exchanged for? <u>Answer:</u> $_____**

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

Section E: Real-World Applications (8 marks)

<u>**Apply ratio and proportion to these practical problems:**</u>

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

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

    <u>**Flour:**</u> _____ g <u>**Sugar:**</u> _____ g <u>**Butter:**</u> _____ 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

- **<u>Direct proportion:</u>** If one quantity increases, the other increases proportionally

- **<u>Unitary method:</u>** Find the value of one unit, then multiply