

Applied Ratio Extension Problems

Recipe Questions Past

1. A muffin recipe makes 12 muffins with the following ingredients:

- 300g flour
- 200g sugar
- 2 eggs (approx. 100g)
- 250ml milk

You want to increase the yield by 50%. Calculate the new quantities for all ingredients.

2. A sauce recipe serves 4 people:

- 400ml tomato passata
- 2 cloves garlic (20g)
- 100ml olive oil
- 50g fresh basil

You only want to make 75% of the original recipe. Calculate the new quantities.

3. A cake recipe that serves 6 people requires:

- 240g flour
- 180g butter
- 150g sugar
- 3 eggs (150g)

You need to serve 10 people. By what percentage must you increase the recipe? Calculate all new ingredient quantities.

4. After cooking, you have 560g of pasta from a recipe that was increased by 40% from its original size. What was the original mass of pasta the recipe made?

5. A bread recipe uses:

- 1000g flour
- 600ml water
- 20g salt
- 15g yeast

The baker makes a new batch using 850g of flour after reducing the recipe.

- (a) By what percentage was the recipe reduced?
- (b) Calculate the new quantities for all other ingredients.

Recipe Questions Future

6. You are making a square brownie. The recipe for a $20\text{cm} \times 20\text{cm}$ tray uses:

- 200g chocolate
- 150g butter
- 3 eggs

You are using a larger $25\text{cm} \times 25\text{cm}$ tray. Calculate the new quantities for all ingredients.

7. You are baking a circular cake. The original recipe is for a cake tin with a diameter of 20cm and uses:

- 250g flour
- 200g sugar
- 4 eggs

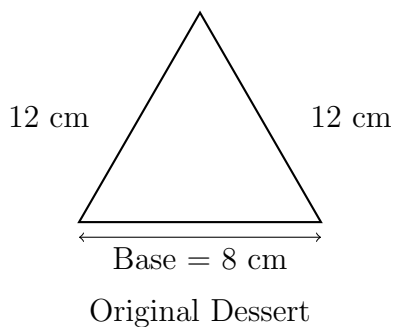
You are using a tin with a diameter of 30cm. Calculate the new quantities.

8. You are making two rectangular pizzas. The large pizza has dimensions $35\text{cm} \times 25\text{cm}$. The small pizza has dimensions $20\text{cm} \times 15\text{cm}$. The small pizza recipe uses:

- 200g cheese
- 150g flour
- 100ml tomato sauce

- (a) What is the area of each pizza?
- (b) How much of each ingredient does the large pizza need?

9. You are decorating the perimeter of a rectangular cake with sprinkles. The cake is 28cm long and 18cm wide. One gram of sprinkles covers 4cm of perimeter.
- 300g cake base
 - 200g icing
 - 50g sprinkles (original amount)
- (a) What is the perimeter of your cake?
- (b) How many grams of sprinkles do you need?
- (c) If you make a cake with double the perimeter, by what factor should you multiply all ingredients?
10. A fancy triangular dessert has side lengths 12cm, 12cm, and 8cm. You create a similar dessert where all side lengths are increased by a scale factor of 1.5.



The original recipe uses:

- 120g sugar (for the area)
 - 80g cocoa powder (for the perimeter decoration)
 - 3 eggs
- (a) What is the perimeter of the original dessert?
- (b) What is the perimeter of the new, larger dessert?
- (c) How much sugar is needed for the larger dessert?
- (d) How much cocoa powder is needed for the larger dessert?
- (e) How many eggs are needed for the larger dessert?

Best Buys Past

11. A 500g box of cereal costs £4.50. A 750g box costs £6.30. Which is the better buy?
12. Store A sells 6 cans of soda for \$4.80. Store B sells the same soda with a 15% discount on single cans that normally cost \$0.95 each. Where should you buy if you need 6 cans?
13. A 2L bottle of juice costs €3.20. The 1.5L bottle is on sale for 20% off its regular price of €2.80. Which size offers better value per liter?
14. **Electronic World** is having a clearance sale:
Headphones: Original £120, now 20% off
Speakers: Original £85, now 30% off

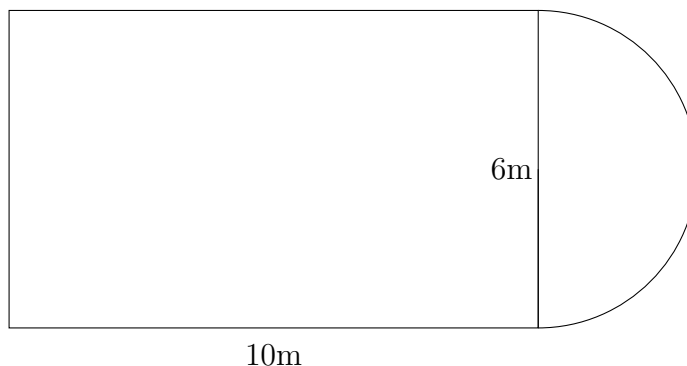
The store is also running a buy 3 items, get the cheapest free deal. You can sell electronics for 50% of non-discounted price to a local shop - what is the cheapest way you can buy both the headphones and speakers?

15. A furniture store offers two payment plans for a £1200 sofa:
Plan A: 25% down payment, then 12 monthly payments of £80
Plan B: No down payment, 18 monthly payments of £75
Considering the total amount paid, which plan is better and by what percentage of the original price?

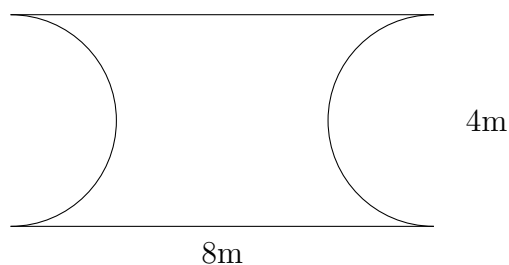
Best Buys Future

16. You need to fence a rectangular garden. Store A sells fencing for \$12 per meter. Store B sells pre-cut 2m sections for \$20 each. Which is cheaper for a $10\text{m} \times 8\text{m}$ garden?
17. You want to tile a floor. Tile Type A costs £25 per square meter. Tile Type B costs £18 per square meter but requires 15% more tiles due to breakage. For a $4\text{m} \times 5\text{m}$ room, what is the lowest price to tile the room?
18. Paint costs £35 per liter and covers 12m^2 per liter. Brand X offers 20% more coverage per liter for £42 per liter. For painting two walls of dimensions $4\text{m} \times 3\text{m}$ and $5\text{m} \times 3\text{m}$, which paint is better value? Buying the cheapest, how much will the paint cost?

19. You need to buy grass seed for a lawn. The lawn consists of a rectangle ($10\text{m} \times 6\text{m}$) with a semicircular extension (radius 3m) at one end. Seed A covers 15m^2 per kg at \$4.80 per kg. Seed B covers 25m^2 per kg at \$7.50 per kg. Which seed is more economical?



20. A swimming pool has the following shape: a central rectangle $8\text{m} \times 4\text{m}$, with semicircular ends of radius 2m . You need to buy a pool cover. Material X costs \$18 per m^2 and lasts 3 years. Material Y costs \$25 per m^2 and lasts 5 years. Considering cost per year, which material is more economical? How much will it cost per year to keep the pool covered for the least price?



Scaling Past

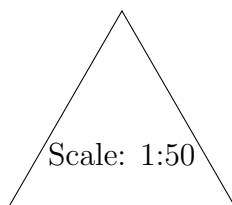
21. A drawing is scaled up by 150%. If the original length was 8 cm, what is the new length?
22. A map scale is 1:25,000. What percentage of the actual distance does 1 cm on the map represent?
23. A photo is reduced to 80% of its original size. If the reduced width is 12 cm, what was the original width?
24. Sarah is creating a scale drawing of her bedroom. She decides to use a scale which represents 2% of actual size. What ratio represents here scale? If her bed measures 2 meters long in reality, what length should she draw it in her scale drawing? Give your answer in centimetres.
25. A company is producing scale models of buildings. Model A is made at 2.5% of actual size, while Model B is made at 4% of actual size.
 - (a) If a window is 1.2 meters wide in the actual building, how wide is it in each model?
 - (b) If Model A's height is 45 cm, what is the actual building's height?
 - (c) What percentage larger is Model B compared to Model A?

Scaling Future

11. A square is enlarged using scale factor 3. If the original perimeter was 12 cm, what is the new perimeter?
12. A scale drawing of a rectangular field uses scale 1:200. If the drawing shows the field as 6 cm $\times$ 4 cm, what is the actual area of the field?

The equilateral triangle below represents a park. If each side s is 2 cm in the drawing, find:

- (a) The actual perimeter of the park
- (b) The actual area of the park (area of equilateral triangle = $\frac{\sqrt{3}}{4}s^2$)



13. A blueprint shows a circular fountain with diameter 3 cm at scale 1:30.
- (a) What is the actual diameter of the fountain?
 - (b) Calculate the actual area of the fountain's surface.
 - (c) If the scale was changed to 1:45, what would be the drawn diameter?
14. An architect creates scale drawings of two similar rectangular rooms. Room A is drawn at scale 1:100 and measures 5 cm $\times$ 4 cm in the drawing. Room B is drawn at scale 1:80 and measures 6 cm $\times$? cm in the drawing.
- (a) Calculate the actual dimensions and area of each room.
 - (b) Which room has the larger actual area and by what percentage?
 - (c) If both drawings were converted to scale 1:50, what would be their new dimensions on paper?