

Foundation GCSE: Proportion Problems

Name: _____

Class: _____

Instructions: Answer all questions. Questions are ordered from easiest (1) to hardest (20). Working out should be shown where appropriate.

1. If 3 notebooks cost £4.50, find the cost of 7 notebooks using the unitary method.
2. A car travels 180 miles on 15 litres of fuel. How far on 25 litres?
3. Concrete is mixed in ratio 1 : 2 : 3 (cement : sand : gravel). How much sand is needed for a total mix of 60 kg?
4. Currency exchange: £1 = \$1.25. How many dollars for £240?
5. Currency exchange: £1 = \$1.25. How many pounds for \$300?
6. 6 people take 4 days to build a shed. How many days would 8 people take?
7. A recipe for 8 people needs 400g flour, 200g sugar, and 150g butter. Adjust for 12 people.
8. If 5 bags of sweets weigh 1.2 kg, find the weight of 12 bags in grams.
9. Two numbers are in the ratio 3 : 5. If their sum is 72, find the larger number.
10. A map has a scale of 1 : 50,000. What real distance in km is represented by 6 cm on the map?
11. If A is directly proportional to B and inversely proportional to C , write the general formula.
12. Using Q11, if $A = 12$ when $B = 8$ and $C = 2$, find the constant of proportionality k .
13. Using Q12, find A when $B = 15$ and $C = 5$.
14. A train travels 240 km in 3 hours. At the same average speed, how long to travel 400 km?
15. If 10 men harvest a field in 6 days, how many men are needed to harvest it in 4 days?
16. An alloy has copper and zinc in ratio 7 : 3. If there is 21 kg of copper, find the total mass of the alloy.
17. Braking distance $d \propto v^2$. If braking distance is 20 m at 30 mph, find braking distance at 60 mph.
18. 4 taps fill a pool in 9 hours. How many hours do 6 taps take?
19. A contractor estimates 15 workers take 12 days to pave a road. After 4 days, 5 workers leave. How many total days does the project take?
20. If 3 engines consume 180 gallons of fuel in 5 hours, how many gallons do 5 engines consume in 8 hours?

Answers & Worked Solutions

1. £10.50 – Cost per notebook = £1.50; $7 \times 1.50 = 10.50$.
2. 300 miles – Rate = 12 miles/litre; $12 \times 25 = 300$.
3. 20 kg – Total parts = 6; sand is $\frac{2}{6}$ of 60 = 20.
4. \$300 – $240 \times 1.25 = 300$.
5. £240 – $300/1.25 = 240$.
6. 3 days – Total person-days = 24; $24/8 = 3$.
7. 600g flour, 300g sugar, 225g butter – Scale factor 1.5.
8. 2880 g – Weight per bag = 240g; $12 \times 240 = 2880$.
9. 45 – One part = 9; larger part = $5 \times 9 = 45$.
10. 3 km – $6 \times 50,000 = 300,000$ cm = 3 km.
11. $A = \frac{kB}{C}$ – General combined proportion formula.
12. $3 - 12 = \frac{k(8)}{2} = 4k \implies k = 3$.
13. $9 - A = \frac{3(15)}{5} = 9$.
14. 5 hours – Speed = 80 km/h; $400/80 = 5$.
15. 15 men – Total man-days = 60; $60/4 = 15$.
16. 30 kg – One part = 3 kg; total parts = 10; $10 \times 3 = 30$.
17. $80 \text{ m} - d = kv^2 \implies k = \frac{1}{45}$; at 60 mph, $d = \frac{3600}{45} = 80$.
18. 6 hours – Total tap-hours = 36; $36/6 = 6$.
19. 16 days – Remaining work = 120 worker-days; $120/10 = 12$ extra days; $4 + 12 = 16$.
20. 400 gallons – Rate = 12 gal/(engine · hour); $5 \times 8 \times 12 = 400$.