

Maths puzzles: open practice pack

25 untimed puzzles on a difficulty 1–5 ladder.

Detail	Value
Pack	puzzles-maths-puzzles
Source	puzzles
Pack version	v1
Worksheet items	25
Authored hints	25
Worked explanations	25

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Learner worksheet

Work the ladder from the top: the early puzzles need two clean steps, the last three need a named technique and an intermediate value carried exactly. Nothing here is timed and nothing is scored. Try the puzzle, take the hint if you stall, then read the explanation even when you were right. The method is the point, and the same wrong base or off-by-one turns up again and again.

Choose one answer for each item. Keep the authored hints, answer key, and worked explanations separate until you are ready to check your work.

Difficulty 1

Start here and establish the method before moving up the ladder.

1. puz-maths-puzzles-01: Berries before and after lunch

Difficulty: Difficulty 1

A market stall opens with 84 punnets of berries. It sells 27 punnets before lunch and 35 punnets after lunch. How many punnets are left at the end of the day?

- A. 22 punnets
- B. 49 punnets
- C. 57 punnets
- D. 62 punnets

Your answer: _____

2. puz-maths-puzzles-02: Bulbs shared five to three

Difficulty: Difficulty 1

Two gardeners share 96 bulbs in the ratio 5 : 3, with the larger share going to the gardener who dug the beds. How many bulbs does the digger receive?

- A. 12 bulbs
- B. 36 bulbs
- C. 60 bulbs
- D. 48 bulbs

Your answer: _____

3. puz-maths-puzzles-03: Weekend-only riders

Difficulty: Difficulty 1

A cycling club has 240 members, and 35% of them ride at weekends only. How many members ride at weekends only?

- A. 24 members
- B. 84 members
- C. 96 members
- D. 156 members

Your answer: _____

4. puz-maths-puzzles-04: Five shifts of crates

Difficulty: Difficulty 1

Over five shifts a volunteer sorted 8, 9, 15, 18 and 20 crates. What is the mean number of crates per shift?

- A. 15 crates
- B. 17.5 crates
- C. 12 crates
- D. 14 crates

Your answer: _____

5. puz-maths-puzzles-05: Ribbon cut into lengths

Difficulty: Difficulty 1

A roll of ribbon is 4.5 metres long. A craft group cuts it into pieces 25 centimetres long. How many whole pieces do they get?

- A. 20 pieces
- B. 18 pieces
- C. 112 pieces
- D. 180 pieces

Your answer: _____

Difficulty 2

Continue in order; use the worked explanations from earlier rungs when needed.

6. puz-maths-puzzles-06: The kettle after the sale

Difficulty: Difficulty 2

In a sale, a kettle is reduced by 20% and now costs £36. What was its price before the reduction?

- A. £45.00
- B. £43.20
- C. £30.00
- D. £28.80

Your answer: _____

7. puz-maths-puzzles-07: Jars in three quarters of an hour

Difficulty: Difficulty 2

A bottling machine fills 120 jars in 30 minutes at a steady rate. Working at the same rate, how many jars does it fill in 45 minutes?

- A. 80 jars
- B. 60 jars
- C. 135 jars
- D. 180 jars

Your answer: _____

8. puz-maths-puzzles-08: The eight-sector spinner

Difficulty: Difficulty 2

A fair spinner has eight equal sectors numbered 1 to 8. What is the probability that a single spin lands on a number greater than 5?

- A. 1 in 2
- B. 5 in 8
- C. 3 in 8
- D. 1 in 4

Your answer: _____

9. puz-maths-puzzles-09: Six more blue counters

Difficulty: Difficulty 2

A tray holds red and blue counters in the ratio 3 : 4, and there are 18 red counters. Six more blue counters are added and no red ones. What is the new ratio of red to blue in its simplest form?

- A. 3 : 5
- B. 3 : 10
- C. 3 : 4
- D. 1 : 1

Your answer: _____

10. puz-maths-puzzles-10: The L-shaped patio

Difficulty: Difficulty 2

An L-shaped patio is a rectangle 8 metres by 5 metres with a rectangle 3 metres by 2 metres removed from one corner. What is the area of the patio?

- A. 40 square metres
- B. 34 square metres
- C. 46 square metres
- D. 30 square metres

Your answer: _____

11. puz-maths-puzzles-11: Two days of loaves

Difficulty: Difficulty 2

The table shows loaves sold at three stalls on each day of one weekend. Across all three stalls, how many more loaves were sold on Sunday than on Saturday?

Loaves sold at three bread stalls over one weekend.

Row	Saturday	Sunday
Rye stall	46	58
Seeded stall	33	29
Plain stall	51	60

- A. 21 loaves
- B. 25 loaves
- C. 12 loaves
- D. 17 loaves

Your answer: _____

Difficulty 3

Continue in order; use the worked explanations from earlier rungs when needed.

12. puz-maths-puzzles-12: Two painters, one fence

Difficulty: Difficulty 3

Working alone, one painter takes 6 hours to paint a fence and another takes 12 hours. Working together, each at their own steady rate, how long do they take?

- A. 9 hours
- B. 3 hours
- C. 4 hours
- D. 18 hours

Your answer: _____

13. puz-maths-puzzles-13: Up in spring, down in autumn

Difficulty: Difficulty 3

A subscription price rises by 20% in spring, then falls by 20% in autumn. Compared with the price before the rise, what is the price after the fall?

- A. The same as before the rise
- B. 4% lower than before the rise
- C. 4% higher than before the rise
- D. 24% lower than before the rise

Your answer: _____

14. puz-maths-puzzles-14: Two digits and a reversal

Difficulty: Difficulty 3

A two-digit number has digits that add up to 11, and reversing its digits gives a number 27 greater than the original. What is the original number?

- A. 47
- B. 74
- C. 38
- D. 56

Your answer: _____

15. puz-maths-puzzles-15: A hundred days from Tuesday

Difficulty: Difficulty 3

A festival stall opens every single day. Today is a Tuesday. What day of the week will it be exactly 100 days from today?

- A. Tuesday
- B. Wednesday
- C. Friday
- D. Thursday

Your answer: _____

16. puz-maths-puzzles-16: Two classes, one mean

Difficulty: Difficulty 3

A tutor marks two classes. The 12 learners in the morning class average 60 marks, and the 18 learners in the afternoon class average 70 marks. What is the mean mark across all 30 learners?

- A. 64 marks
- B. 65 marks
- C. 66 marks
- D. 70 marks

Your answer: _____

17. puz-maths-puzzles-17: Mugs and bowls

Difficulty: Difficulty 3

At a pottery stall, three mugs and two bowls cost £31 altogether, while one mug and two bowls cost £21 altogether. What does one mug cost?

- A. £5
- B. £8
- C. £10
- D. £6.20

Your answer: _____

Difficulty 4

Continue in order; use the worked explanations from earlier rungs when needed.

18. puz-maths-puzzles-18: At least one yellow bead

Difficulty: Difficulty 4

A bag holds 5 green beads and 3 yellow beads. Two beads are drawn out one after the other without replacement. What is the probability that at least one of them is yellow?

- A. 5 in 14
- B. 9 in 14
- C. 3 in 4
- D. 15 in 28

Your answer: _____

19. puz-maths-puzzles-19: Cookery books side by side

Difficulty: Difficulty 4

Five different books are placed in a row on a shelf. Two of them are cookery books and must stand next to each other. How many different arrangements of the five books are possible?

- A. 24 arrangements
- B. 72 arrangements
- C. 120 arrangements
- D. 48 arrangements

Your answer: _____

20. puz-maths-puzzles-20: The interrupted ride

Difficulty: Difficulty 4

A courier rides 30 km at 15 km/h, stops for 20 minutes, then rides a further 12 km at 8 km/h. How long does the whole journey take, including the stop?

- A. 3 hours 20 minutes
- B. 3 hours 30 minutes
- C. 3 hours 50 minutes
- D. 4 hours 10 minutes

Your answer: _____

21. puz-maths-puzzles-21: Three weeks of algae

Difficulty: Difficulty 4

Algae on a pond cover 8 square metres today and the covered area grows by 50% every week. What area do they cover three weeks from today?

- A. 27 square metres
- B. 20 square metres
- C. 18 square metres
- D. 12 square metres

Your answer: _____

22. puz-maths-puzzles-22: Offers against applications

Difficulty: Difficulty 4

The table shows one hiring round. Which department made offers to the largest proportion of the people who applied to that department?

Applications received and offers made by four departments in one hiring round.

Row	Applications	Offers made
Design	60	15
Support	80	24
Logistics	200	40
Finance	150	27

- A. Logistics
- B. Design
- C. Finance
- D. Support

Your answer: _____

Difficulty 5

Continue in order; use the worked explanations from earlier rungs when needed.

23. puz-maths-puzzles-23: The same remainder three times

Difficulty: Difficulty 5

What is the smallest whole number greater than 1 that leaves a remainder of 1 when it is divided by 4, when it is divided by 5, and when it is divided by 6?

- A. 31
- B. 61
- C. 60
- D. 121

Your answer: _____

24. puz-maths-puzzles-24: Badges, pens and sixty-one pounds

Difficulty: Difficulty 5

A club spends exactly £61 on badges costing £3 each and pens costing £7 each, buying at least one of each. It buys more pens than badges. How many pens does it buy?

- A. 1 pen
- B. 4 pens
- C. 7 pens
- D. 8 pens

Your answer: _____

25. puz-maths-puzzles-25: The tank over three days

Difficulty: Difficulty 5

A tank holds 180 litres of water. On day one a third of the water is drawn off. On day two a quarter of what is then left is drawn off. On day three 25 litres are added. How much water is in the tank at the end of day three?

- A. 115 litres
- B. 100 litres
- C. 90 litres
- D. 130 litres

Your answer: _____

Authored hints

Only hints supplied by the puzzle authors are included. Items without a source hint are listed as missing; no hint text is generated or inferred.

0 worksheet items do not have an authored hint. No hint text was generated for them.

puz-maths-puzzles-01: Subtract the two sales one after the other, then re-read exactly what the question asks you to report.

puz-maths-puzzles-02: Count how many equal parts the ratio contains before you divide anything.

puz-maths-puzzles-03: Find 10% first, then scale that up to the percentage you actually need.

puz-maths-puzzles-04: Add all five values, then divide by how many values you added, not by how many gaps there are.

puz-maths-puzzles-05: Put both lengths into centimetres before you do anything else with them.

puz-maths-puzzles-06: The price you are given is not the whole; it is 80% of the number you are looking for.

puz-maths-puzzles-07: Work out how many jars a single minute produces, then scale that up.

puz-maths-puzzles-08: List the sectors that qualify rather than counting them in your head.

puz-maths-puzzles-09: Convert the ratio into real counts of counters first, then add.

puz-maths-puzzles-10: Find the area of the complete rectangle first, then decide what the corner does to it.

puz-maths-puzzles-11: Total each day down its own column, and keep the sign of every stall's change.

puz-maths-puzzles-12: Ask how much of the fence each painter finishes in one hour, then combine those fractions.

puz-maths-puzzles-13: Set the price at 100 and follow it through both changes, watching which figure each percentage is taken from.

puz-maths-puzzles-14: Reversing a two-digit number changes it by nine times the difference between its digits.

puz-maths-puzzles-15: Divide by 7 and use nothing but the remainder.

puz-maths-puzzles-16: The classes are different sizes, so the two means cannot simply be averaged.

puz-maths-puzzles-17: Both purchases contain exactly the same number of bowls; use that to make the bowls disappear.

puz-maths-puzzles-18: It is far quicker to work out the chance of drawing no yellow at all, then take that away from 1.

puz-maths-puzzles-19: Treat the two cookery books as a single item, then remember they can still swap places inside it.

puz-maths-puzzles-20: Time each leg separately with distance divided by speed, converting the decimal part of an hour with care.

puz-maths-puzzles-21: Multiply by 1.5 once for each week rather than adding the same amount each time.

puz-maths-puzzles-22: Each department has to be judged against its own application total, not against the whole hiring round.

puz-maths-puzzles-23: Take the remainder off first and look for the smallest number all three divisors go into exactly.

puz-maths-puzzles-24: List every whole number of the dearer item that fits inside the budget, then test each case against the remaining condition.

puz-maths-puzzles-25: Each fraction applies to what is left at that stage, not to the amount you started with.

Answer key

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Maths puzzles: open practice pack answer key

Item	Choice	Answer
puz-maths-puzzles-01	A	22 punnets
puz-maths-puzzles-02	C	60 bulbs
puz-maths-puzzles-03	B	84 members
puz-maths-puzzles-04	D	14 crates
puz-maths-puzzles-05	B	18 pieces
puz-maths-puzzles-06	A	£45.00
puz-maths-puzzles-07	D	180 jars
puz-maths-puzzles-08	C	3 in 8
puz-maths-puzzles-09	A	3 : 5
puz-maths-puzzles-10	B	34 square metres
puz-maths-puzzles-11	D	17 loaves
puz-maths-puzzles-12	C	4 hours
puz-maths-puzzles-13	B	4% lower than before the rise

puz-maths-puzzles-14	A	47
puz-maths-puzzles-15	D	Thursday
puz-maths-puzzles-16	C	66 marks
puz-maths-puzzles-17	A	£5
puz-maths-puzzles-18	B	9 in 14
puz-maths-puzzles-19	D	48 arrangements
puz-maths-puzzles-20	C	3 hours 50 minutes
puz-maths-puzzles-21	A	27 square metres
puz-maths-puzzles-22	D	Support
puz-maths-puzzles-23	B	61
puz-maths-puzzles-24	C	7 pens
puz-maths-puzzles-25	A	115 litres

Worked explanations

puz-maths-puzzles-01: Work through the events in the order they happen and keep a running total rather than juggling three numbers at once. Starting from 84 punnets, the morning sales leave $84 - 27 = 57$, and the afternoon sales leave $57 - 35 = 22$. A tempting wrong route adds the two sales together and reports 62, which is how many went out rather than how many remain, while stopping after one subtraction reports the midday stock of 57. Whenever a problem lists several changes, decide first whether the question asks for what is left or for what has gone.

puz-maths-puzzles-02: Sharing in a ratio is solved by counting parts first. The ratio 5 : 3 has $5 + 3 = 8$ parts in total, so one part is $96 \div 8 = 12$ bulbs, and the larger share is $5 \times 12 = 60$ bulbs. Reporting 12 stops at the size of a single part, and 36 hands over the smaller share by scaling the wrong number of parts. Splitting into two lots of 48 ignores the ratio altogether and would only be right if the two shares were equal.

puz-maths-puzzles-03: A percentage is a share out of 100, so 35% of 240 is $240 \times 35 \div 100 = 84$ members. It is faster to find 10% first, which is 24, then take three lots of 24 plus half of 24: $72 + 12 = 84$. The value 156 is the rest of the club, the other 65%, which is what you get by subtracting the share instead of taking it. Rounding 35% up to a friendlier 40% inflates the count to 96, so keep the awkward percentage and split it into tenths.

puz-maths-puzzles-04: The mean is the total shared out equally, so add first and then divide by how many values you added: $8 + 9 + 15 + 18 + 20 = 70$, and $70 \div 5 = 14$ crates. The two commonest slips are dividing by one fewer than the count, which gives 17.5, and reporting the middle value of 15, which is the median rather than the mean. Use a size check every time: a mean must sit between the smallest and the largest value, so anything above 20 or below 8 is wrong before you look further.

puz-maths-puzzles-05: Convert to one common unit before dividing. There are 100 centimetres in a metre, so 4.5 m is 450 cm, and $450 \div 25 = 18$ whole pieces. Multiplying instead of dividing gives 112, which is a length rather than a count, and using 1000 to the metre turns the roll into 4500 cm and 180 pieces, so check which conversion factor belongs to which pair of units. Rounding 4.5 m up to 5 m before converting quietly adds half a metre of ribbon that does not exist.

puz-maths-puzzles-06: This is a reverse percentage: the £36 is not the whole, it is 80% of the whole once a fifth has come off. Write the relationship as $0.8 \times \text{original} = 36$, so the original is $36 \div 0.8 = £45$. Adding 20% back on to the reduced price gives £43.20, which is too small precisely because the 20% is then being taken from a smaller base. When a figure has already been changed, divide by the multiplier to undo it rather than multiplying by the same percentage again.

puz-maths-puzzles-07: Rate problems become simple once you find the amount for one unit of time: $120 \div 30 = 4$ jars a minute, so 45 minutes gives $4 \times 45 = 180$ jars. Adding 15 jars for the extra 15 minutes produces 135 and silently assumes a rate of one jar a minute, while working out only the extra quarter of an hour produces 60 and answers a question that was not asked. Multiplying by $30/45$ rather than $45/30$ inverts the ratio and gives 80, so sanity-check the direction: more time must mean more jars.

puz-maths-puzzles-08: With equally likely outcomes, probability is the count of favourable outcomes over the count of all outcomes. The numbers greater than 5 are 6, 7 and 8, so three of the eight sectors qualify and the probability is 3 in 8. Reading 'greater than 5' as 'from 5 upwards' sweeps in a fourth sector and gives an even chance, and counting the sectors that fail instead gives 5 in 8. Write out the qualifying outcomes rather than counting them in your head; that habit removes the off-by-one entirely.

puz-maths-puzzles-09: Turn a ratio into actual counts before you change anything. Red is 3 parts and equals 18 counters, so one part is 6 and blue is $4 \times 6 = 24$ counters. Adding six blue turns $18 : 24$ into $18 : 30$, and dividing both sides by 6 simplifies it to $3 : 5$. Adding the six to the ratio figure instead of to the count gives $3 : 10$, and adding the counters to the red side produces an even split. A ratio only survives an addition unchanged when both sides grow in proportion, never when both grow by the same amount.

puz-maths-puzzles-10: Composite shapes are handled by taking a whole rectangle and subtracting the piece that is missing. The full rectangle is $8 \times 5 = 40$ square metres, the removed corner is $3 \times 2 = 6$ square metres, and $40 - 6 = 34$ square metres. Using the corner's perimeter of $2 \times (3 + 2) = 10$ instead of its area takes away the wrong quantity and lands on 30, and joining the corner on rather than cutting it out gives 46. Decide whether the second shape is being added or removed before touching the arithmetic, and keep areas with areas.

puz-maths-puzzles-11: Total each column before comparing anything, rather than reading across row by row and hoping. Saturday comes to $46 + 33 + 51 = 130$ and Sunday to $58 + 29 + 60 = 147$, a rise of 17 loaves. Counting only the stalls that improved gives 21, and treating the seeded stall's fall of 4 as though it were another rise gives 25. The change in a total is the sum of the individual changes with their signs kept, so a fall has to be subtracted, not quietly folded in.

puz-maths-puzzles-12: Combined-work problems are added as rates, never as times. In one hour the faster painter completes $1/6$ of the fence and the slower one $1/12$, so together they complete $1/6 + 1/12 = 3/12 = 1/4$ of the fence each hour, which means four hours for the whole job. Averaging the two times to 9 hours is the classic trap, and adding them to 18 hours is worse: extra help cannot make a job slower. Use that as your check. The joint time must always be less than the shorter time alone.

puz-maths-puzzles-13: Successive percentage changes multiply; they do not add or cancel. Take the starting price as 100: the rise makes it 120, and 20% of 120 is 24, so the fall lands on 96, which is 4% below the start. The trap is the base. The reduction is taken from the larger figure, so it outweighs the rise, and describing the 24-unit drop as 24% measures it against the original instead of against the 120 it actually came from. A rise followed by an equal percentage fall always leaves you slightly worse off than you started.

puz-maths-puzzles-14: Turn each stated condition into an equation about the digits. With tens digit t and units digit u , the digit sum gives $t + u = 11$, and reversing changes the value by $(10u + t) - (10t + u) = 9(u - t)$, so $9(u - t) = 27$ means $u - t = 3$. Solving the pair gives $t = 4$ and $u = 7$, and $74 - 47 = 27$ confirms it. Numbers such as 38 and 56 satisfy only the digit sum, which is why both conditions must be used, and 74 is the reversal rather than the original. Reversing a two-digit number always changes it by a multiple of 9.

puz-maths-puzzles-15: Day-of-the-week questions are remainder questions, because the week is a cycle of length 7. Since $100 = 14 \times 7 + 2$, the whole weeks land you back on a Tuesday and only the remainder of 2 moves you on, giving Thursday. Stopping at 98 days uses the whole cycles alone and returns Tuesday itself, and counting today as day one shifts everything by a day. Divide by the cycle length, discard the complete cycles, and step forward by the remainder only.

puz-maths-puzzles-16: This is a weighted mean: each group counts in proportion to its size, so rebuild the totals. The marks add to $12 \times 60 + 18 \times 70 = 720 + 1260 = 1980$, and $1980 \div 30 = 66$ marks. The plain

average of 60 and 70 gives 65 and would only be right if the two classes were the same size, while swapping the weights over gives 64. Expect a weighted mean to sit nearer the mean of the larger group, that tells you at a glance which side of the midpoint your result belongs on.

puz-maths-puzzles-17: Two equations in two unknowns are easiest when one unknown appears identically in both, because subtracting then eliminates it. Both purchases contain two bowls, so $(3m + 2b) - (m + 2b) = 31 - 21$ leaves $2m = 10$, giving a mug at £5 and, by substitution, a bowl at £8. Halving is the step people forget: £10 is the cost of two mugs, not one. Dividing £31 by the five articles gives £6.20 and assumes mugs and bowls cost the same, which the second purchase disproves. Look for the term that cancels before reaching for anything heavier.

puz-maths-puzzles-18: An 'at least one' question is nearly always easier through its opposite, because 'none' is a single case. The chance that neither bead is yellow is $\frac{5}{8} \times \frac{4}{7} = \frac{20}{56} = \frac{5}{14}$, so the chance of at least one yellow is $1 - \frac{5}{14} = \frac{9}{14}$. Adding the two draws' chances of $\frac{3}{8}$ gives $\frac{3}{4}$ and double-counts the outcome where both beads are yellow. Note also that exactly one yellow is a different question with the value $\frac{15}{28}$; 'at least one' has to include the both-yellow case as well.

puz-maths-puzzles-19: When two items must be adjacent, glue them together and count the block as one item. That leaves four items to order, giving $4! = 24$ ways, and the two cookery books can be swapped within the block, giving $24 \times 2 = 48$ arrangements. Forgetting the internal swap halves the count to 24, and ignoring the restriction altogether gives $5! = 120$. The 72 that remains after $120 - 48$ counts the arrangements where the pair is separated, which is the complement of what was asked.

puz-maths-puzzles-20: Split a journey into stages, time each stage with distance $\div$ speed, and only then add. The first leg takes $30 \div 15 = 2$ hours, the second takes $12 \div 8 = 1.5$ hours, and the stop adds 20 minutes, so the total is 3 hours 50 minutes. Writing 1.5 hours as '1 hour 50 minutes' is the decimal trap, since half an hour is 30 minutes, and it inflates the total by 20 minutes. Dropping the stop entirely leaves 3 hours 30 minutes. Never average the two speeds: that shortcut only works when the two legs take equal time, which they do not here.

puz-maths-puzzles-21: Growth by a fixed percentage each period is repeated multiplication, not repeated addition. Each week the area is multiplied by 1.5, so the run is $8 \rightarrow 12 \rightarrow 18 \rightarrow 27$ square metres. Adding a flat 4 square metres a week, as though the increase stayed at half of the starting area, gives 20 and understates compound growth badly over more periods. The figures 12 and 18 are the areas after one week and after two, so count multiplications rather than the weeks named in the story.

puz-maths-puzzles-22: The whole difficulty here is the base. A department's success rate is its own offers divided by its own applications: $\frac{15}{60} = 25\%$, $\frac{24}{80} = 30\%$, $\frac{40}{200} = 20\%$ and $\frac{27}{150} = 18\%$, so the support team leads on 30% despite making fewer offers than two other departments. Picking the department with the most offers compares each figure with the total offers instead, which is a different question. Picking the smallest gap between applications and offers rewards being small rather than being selective, and dividing applications by offers reverses the relation, so the largest quotient there is actually the weakest rate.

puz-maths-puzzles-23: A number that leaves the same remainder under several divisors is that remainder more than a common multiple of them, so strip the remainder off first and look for the lowest common multiple. The smallest number divisible by 4, 5 and 6 is 60, not 120, because 4 and 6 already share a factor of 2; adding the remainder back gives 61. Using only 5 and 6 gives 30 and the tempting 31, which fails as soon as you divide by 4, while 60 itself leaves no remainder at all. Every later solution is another 60 further on, which is where 121 comes from.

puz-maths-puzzles-24: One equation in two unknowns is only pinned down by the whole-number requirement, so run an exhaustive case split on the dearer item. From $3b + 7p = 61$: seven pens cost £49 and leave £12, which is exactly 4 badges; four pens leave £33, which is 11 badges; one pen leaves £54, which is 18 badges. Money alone therefore allows three cases, and the condition that pens outnumber badges eliminates all but seven pens with four badges. Eight pens cost £56 and leave £5, which is not a multiple of 3, so that case never gets started. Testing the dearer item first keeps the number of cases small.

puz-maths-puzzles-25: Multi-stage problems go wrong when a fraction is applied to the wrong quantity, so carry each intermediate value exactly and label what it refers to. A third of 180 litres is 60, leaving 120; a quarter of that remainder is 30, leaving 90; adding 25 finishes on 115 litres. Taking the quarter from the original 180 removes 45 and lands on 100, which is also where you land if you add the two fractions and remove $\frac{7}{12}$ in one go. Taking a quarter of the 60 already drawn off removes only 15 and lands on 130. Each fraction refers to what is in the tank at that moment.

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