

Spatial and visual: open practice pack

25 untimed puzzles on a difficulty 1–5 ladder.

Detail	Value
Pack	puzzles-spatial-and-visual
Source	puzzles
Pack version	v1
Worksheet items	25
Authored hints	25
Worked explanations	25

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Learner worksheet

Work the ladder in order: the early puzzles fix one idea at a time and the later ones combine them. Nothing here is timed and nothing is scored. Sketch freely. Most spatial questions get easier the moment something is on paper, and turning a real scrap of paper is a legitimate way to check a folding puzzle. Read the explanation even when you were right: it names the method, and the method is what carries over to the next puzzle.

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-spatial-and-visual-01: Turning the corner piece

Difficulty: Difficulty 1

The figure below is turned 90 degrees clockwise, staying flat on the page. Which description matches the result?

Figure: The starting figure, drawn on a three-by-three block grid. A hash is a filled block.

A three-by-three grid of blocks. The whole left-hand column is filled, top to bottom, and the whole bottom row is filled, left to right. Together they form an upright L: a tall arm rising from the bottom-left corner and a foot running right along the bottom.

- A. A bar across the top with an upright arm hanging from its left end
- B. A bar across the top with an upright arm hanging from its right end
- C. A bar across the bottom with an upright arm rising from its right end

- D. An upright arm down the right-hand side with a bar across the bottom

Your answer: _____

2. puz-spatial-and-visual-02: The mirrored floor plan

Difficulty: Difficulty 1

A room is drawn from above with north at the top. A desk stands against the north wall, towards the east corner; a door sits in the middle of the west wall. The plan is reflected in a mirror line running north to south down its middle. Where are the desk and the door in the reflected plan?

- A. Desk against the north wall towards the east corner; door in the middle of the east wall
- B. Desk against the south wall towards the east corner; door in the middle of the west wall
- C. Desk against the north wall towards the west corner; door in the middle of the east wall
- D. Desk against the south wall towards the west corner; door in the middle of the east wall

Your answer: _____

3. puz-spatial-and-visual-03: Edges of the pointed solid

Difficulty: Difficulty 1

A solid has a square base, and four triangular sides that rise from the base and meet at a single point above it. How many edges does the solid have in total?

- A. 4 edges
- B. 8 edges
- C. 5 edges
- D. 12 edges

Your answer: _____

4. puz-spatial-and-visual-04: Finishing the small square

Difficulty: Difficulty 1

In the two-by-two pattern below, the same change happens from left to right in each row. What belongs in the empty cell?

Figure: A two-by-two pattern; the bottom-right cell is blank.

A two-by-two arrangement of small figures. The top row shows an empty circle on the left and a circle containing a single dot on the right. The bottom row shows an empty square on the left and a blank cell on the right that has to be filled.

- A. A circle with a dot inside it
- B. A completely shaded square
- C. A square with a dot just outside its top-right corner
- D. A square with a dot inside it

Your answer: _____

5. puz-spatial-and-visual-05: Squares inside the strip

Difficulty: Difficulty 1

How many squares of any size can be found in the figure below? Count the small cells and any larger squares that the cells form together.

Figure: A grid two cells tall and three cells wide.

A rectangle divided into six equal cells arranged in two rows of three, so the whole figure is two cells tall and three cells wide. All cells are the same size and none is subdivided.

- A. 6 squares
- B. 8 squares
- C. 7 squares
- D. 9 squares

Your answer: _____

Difficulty 2

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

6. puz-spatial-and-visual-06: The card turned right round

Difficulty: Difficulty 2

A rectangular card has a small notch cut from its top-left corner and a hole punched near its bottom edge, slightly right of centre. The card is turned 180 degrees in its own plane; it is not flipped over. Where are the notch and the hole now?

- A. Notch at the bottom-left corner; hole near the top edge, slightly right of centre
- B. Notch at the top-right corner; hole near the bottom edge, slightly left of centre
- C. Notch at the bottom-right corner; hole near the bottom edge, slightly left of centre
- D. Notch at the bottom-right corner; hole near the top edge, slightly left of centre

Your answer: _____

7. puz-spatial-and-visual-07: Which flat pattern makes a cube

Difficulty: Difficulty 2

Each description below is a flat arrangement of six identical squares joined edge to edge. Which one can be folded up into a closed cube?

- A. A row of four squares, with one square attached above the second and one attached below the third
- B. A row of four squares, with one square attached above the first and one attached above the second
- C. A row of five squares, with one square attached above the second
- D. Two rows of three squares, one row directly above the other

Your answer: _____

8. puz-spatial-and-visual-08: The stacked cubes

Difficulty: Difficulty 2

Identical cubes are stacked in a corner. The bottom layer is a solid three-by-three square of cubes, a solid two-by-two square of cubes sits on top of that, and one single cube sits on top of those. No cube is missing from any layer. How many cubes are there altogether?

- A. 6 cubes

- B. 13 cubes
- C. 14 cubes
- D. 9 cubes

Your answer: _____

9. puz-spatial-and-visual-09: Reflecting in the diagonal

Difficulty: Difficulty 2

Two counters sit on a three-by-three board: one in the top row, middle column; one in the bottom row, left column. The pattern is reflected in the diagonal running from the top-left corner to the bottom-right corner. Where are the counters afterwards?

- A. Middle row left column, and bottom row left column
- B. Bottom row middle column, and top row right column
- C. Top row middle column, and bottom row right column
- D. Middle row left column, and top row right column

Your answer: _____

10. puz-spatial-and-visual-10: Two rows of boxes

Difficulty: Difficulty 2

One rule runs along each row of the figure below. What belongs in the empty box?

Figure: Two rows of three boxes; the last box of the lower row is empty.

Two rows of three boxes. The upper row holds, from left to right, a box containing one circle, a box containing two circles, and a box containing three circles. The lower row holds a box containing one cross, a box containing two crosses, and an empty box to be filled.

- A. A box holding three circles
- B. A box holding three crosses
- C. A box holding four crosses
- D. A box holding two crosses

Your answer: _____

11. puz-spatial-and-visual-11: The shape that will not fold

Difficulty: Difficulty 2

Three of the shapes below can be folded along some straight line so that the two halves land exactly on each other. Which shape cannot?

- A. A right-angled triangle whose two shorter sides have different lengths
- B. A triangle with two sides of equal length
- C. A rectangle twice as long as it is wide
- D. A semicircle, made by cutting a disc along a diameter

Your answer: _____

Difficulty 3

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

12. puz-spatial-and-visual-12: One fold, one punch

Difficulty: Difficulty 3

A square sheet is folded once, bringing the bottom edge up onto the top edge. A single hole is then punched through both layers, in the left half of the folded sheet and a little way above the fold. The sheet is unfolded flat. What do you see?

- A. One hole only, in the left half, just above the horizontal centre line
- B. Two holes the same distance above the centre line, one in the left half and one in the right half
- C. Two holes in the left half, one just above and one just below the centre line, each the same distance from it
- D. Two holes in the left half, both above the centre line, one near the top edge and one near the fold

Your answer: _____

13. puz-spatial-and-visual-13: Two things change at once

Difficulty: Difficulty 3

Each step along a row changes the figure in two ways at once. The top row runs: a plain triangle, a shaded square, a plain pentagon. The bottom row runs: a plain square, a shaded pentagon, then a gap. What belongs in the gap?

- A. A shaded hexagon
- B. A plain pentagon
- C. A shaded seven-sided shape
- D. A plain hexagon

Your answer: _____

14. puz-spatial-and-visual-14: Turning and swapping

Difficulty: Difficulty 3

A tile shows an arrow pointing up; its head is shaded and its tail is plain. Each move turns the tile a quarter turn clockwise and also swaps the shading, so whatever was shaded becomes plain and whatever was plain becomes shaded. What does the tile look like after three moves?

- A. An arrow pointing left, with a plain head and a shaded tail
- B. An arrow pointing left, with a shaded head and a plain tail
- C. An arrow pointing right, with a plain head and a shaded tail
- D. An arrow pointing down, with a plain head and a shaded tail

Your answer: _____

15. puz-spatial-and-visual-15: Seen from the other side

Difficulty: Difficulty 3

Four posts stand in a straight line running east to west. Someone standing south of the line and facing it reads the posts from left to right as: striped, plain, notched, capped. Another person walks round to the north of the line and faces it. What do they read from left to right?

- A. Striped, plain, notched, capped
- B. Capped, notched, plain, striped
- C. Striped, notched, plain, capped
- D. Capped, plain, notched, striped

Your answer: _____

16. puz-spatial-and-visual-16: Every rectangle in the grid

Difficulty: Difficulty 3

How many rectangles of any size can be found in the figure below? Count every rectangle, not only the ones that happen to be squares.

Figure: A grid two cells tall and four cells wide.

A rectangle divided into eight equal cells arranged in two rows of four, so the figure is two cells tall and four cells wide. Five vertical lines and three horizontal lines make up the grid.

- A. 8 rectangles
- B. 11 rectangles
- C. 30 rectangles
- D. 20 rectangles

Your answer: _____

17. puz-spatial-and-visual-17: The arrow on the folded wall

Difficulty: Difficulty 3

A flat cross of five squares makes an open box: a base square with one square joined to each of its four sides, folded up to form walls. On the flat cross, the square to the left of the base carries an arrow pointing away from the base, towards the left. Once the walls are folded upright, where does that arrow point?

- A. Down towards the base of the box
- B. Horizontally across the box, towards the opposite wall
- C. Horizontally along the wall it is drawn on
- D. Straight up, away from the base

Your answer: _____

Difficulty 4

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

18. puz-spatial-and-visual-18: Two folds, one punch

Difficulty: Difficulty 4

A square sheet is folded in half, bottom edge up onto the top edge, then folded in half again, left edge across onto the right edge. One hole is punched through the folded packet, at the centre of the small square that results. The sheet is unfolded flat. What do you see?

- A. Four holes, one at the centre of each quarter of the sheet
- B. Two holes in the top half, one on each side of the vertical centre line
- C. Two holes in the right half, one above and one below the horizontal centre line
- D. One hole at the exact centre of the sheet

Your answer: _____

19. puz-spatial-and-visual-19: Every shape once, every count once

Difficulty: Difficulty 4

In the matrix below, each row contains each of the three shapes exactly once and each of the three dot counts exactly once; the same is true of each column. What belongs in the empty cell?

Figure: A three-by-three matrix. T is a triangle, S a square, C a circle; each full stop after the letter is one dot inside that shape.

A three-by-three matrix of shapes containing dots. Top row: a triangle with one dot, a square with two dots, a circle with three dots. Middle row: a square with three dots, a circle with one dot, a triangle with two dots. Bottom row: a circle with two dots, a triangle with three dots, and an empty cell to be filled.

- A. A circle with one dot
- B. A square with three dots
- C. A square with one dot
- D. A triangle with two dots

Your answer: _____

20. puz-spatial-and-visual-20: Tipping and turning the cube

Difficulty: Difficulty 4

A cube sits with a star on top, a cross underneath, a circle facing you, a square on the far face, a triangle on the left and an arrow on the right. Tip it forward so the top face swings down onto the front, then turn it a quarter turn clockwise as seen from above. Which face is on top, and which faces you?

- A. The star is on top and the arrow faces you
- B. The square is on top and the arrow faces you
- C. The square is on top and the triangle faces you
- D. The circle is on top and the square faces you

Your answer: _____

21. puz-spatial-and-visual-21: Three lines through a rectangle

Difficulty: Difficulty 4

A rectangle has both of its diagonals drawn, and also the straight line joining the midpoints of its left and right sides. Into how many separate regions is the inside of the rectangle divided?

- A. 4 regions
- B. 8 regions
- C. 5 regions
- D. 6 regions

Your answer: _____

22. puz-spatial-and-visual-22: Walking the grid

Difficulty: Difficulty 4

You start on a square grid facing north. Walk forward three squares, turn right, walk two, turn right, walk

three, turn left, walk one, turn left, walk two. Which way are you facing, and where are you relative to your starting square?

- A. Facing north, three squares east and two squares north of the start
- B. Facing east, three squares east and two squares north of the start
- C. Facing north, two squares east and three squares north of the start
- D. Facing south, three squares east and two squares north of the start

Your answer: _____

Difficulty 5

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

23. puz-spatial-and-visual-23: The off-centre fold

Difficulty: Difficulty 5

A square sheet measures eight units by eight. Its left edge folds across to the right, with the crease three units from the left edge; the bottom edge then folds up onto the top edge. A hole is punched through every layer, two units in from the packet's left edge and two units above its foot. What do you see once the sheet is unfolded?

- A. Two holes, both five units from the left edge, at heights of two and six units
- B. Four holes: two of them one unit from the left edge and two of them five units from the left edge, each pair at heights of two and six units
- C. Four holes: two of them three units from the left edge and two of them five units from the left edge, each pair at heights of two and six units
- D. Four holes, all at a height of six units, one unit, three units, five units and seven units from the left edge

Your answer: _____

24. puz-spatial-and-visual-24: Rows one way, shading the other

Difficulty: Difficulty 5

In the matrix below, one rule runs along the rows and a different rule governs the shading. What belongs in the empty cell?

Figure: A three-by-three matrix. T is a triangle, S a square, C a circle; the digit is the number of dots inside the shape; a star means that shape is shaded.

A three-by-three matrix. Top row: a shaded triangle with one dot, a plain triangle with two dots, a plain triangle with three dots. Middle row: a plain square with two dots, a shaded square with three dots, a plain square with four dots. Bottom row: a plain circle with three dots, a plain circle with four dots, and an empty cell to be filled.

- A. A plain circle with five dots
- B. A shaded circle with four dots
- C. A shaded square with five dots
- D. A shaded circle with five dots

Your answer: _____

25. puz-spatial-and-visual-25: Turn then mirror

Difficulty: Difficulty 5

A tile shows an upright pole with a small flag attached at the top, sticking out to the right. The tile is first turned a quarter turn clockwise, and then reflected in a vertical mirror line. What does it show at the end?

- A. A horizontal pole with its top end on the right and the flag standing up near that end
- B. A horizontal pole with its top end on the right and the flag hanging below near that end
- C. A horizontal pole with its top end on the left and the flag hanging below near that end
- D. An upright pole with the flag at the top sticking out to the left

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-spatial-and-visual-01: Decide where the tall arm ends up first, then attach the foot to the corner they share.

puz-spatial-and-visual-02: Ask which compass directions the mirror line separates, and leave the other pair alone.

puz-spatial-and-visual-03: Split the count into the edges you would trace around the base and the edges that climb.

puz-spatial-and-visual-04: Name in words the one thing that happens between the two figures in the top row.

puz-spatial-and-visual-05: Work out how many positions a two-cell-wide square can occupy before you count any.

puz-spatial-and-visual-06: A half turn is two quarter turns; check that both features move, not just the obvious one.

puz-spatial-and-visual-07: Wrap the longest row into a band in your head, then ask what is left to close the two ends.

puz-spatial-and-visual-08: Turn each layer into a count of cubes before you add, and check you have used every layer.

puz-spatial-and-visual-09: Give each cell a row number and a column number, then see what the diagonal does to the pair.

puz-spatial-and-visual-10: Check the top row for what the count does; two terms alone can fit more than one rule.

puz-spatial-and-visual-11: For each shape, try to name the fold line out loud; the one you cannot name is the answer.

puz-spatial-and-visual-12: Count the layers the punch goes through; that is how many holes you will find.

puz-spatial-and-visual-13: Write the two tracks as two short lists, one for sides and one for shading, then extend both.

puz-spatial-and-visual-14: Handle direction and shading separately, and count how many steps each one needs to repeat.

puz-spatial-and-visual-15: Nothing physically moves; ask only which end of the row is now on the viewer's left.

puz-spatial-and-visual-16: Count the vertical lines and the horizontal lines, then think about choosing two of each.

puz-spatial-and-visual-17: Find the hinge line first, then ask whether the arrow runs along it or away from it.

puz-spatial-and-visual-18: Work out how many layers the punch went through before you think about where anything lands.

puz-spatial-and-visual-19: Treat shape and dot count as two separate puzzles, and finish each row and column in turn.

puz-spatial-and-visual-20: Note which pair of faces each movement leaves untouched; that halves the bookkeeping.

puz-spatial-and-visual-21: Notice where all three lines meet, then add them one at a time and count what each one cuts.

puz-spatial-and-visual-22: Track the heading and the two distance totals separately, and change the heading before you move.

puz-spatial-and-visual-23: Reflect in the crease itself: a point two units past a crease lands two units short of it.

puz-spatial-and-visual-24: Two features fit the rows and one does not; trace the odd one out through the matrix on its own.

puz-spatial-and-visual-25: Do the two moves in the stated order, and check what happens to the flag's side at each step.

Answer key

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Spatial and visual: open practice pack answer key

Item	Choice	Answer
puz-spatial-and-visual-01	A	A bar across the top with an upright arm hanging from its left end
puz-spatial-and-visual-02	C	Desk against the north wall towards the west corner; door in the middle of the east wall
puz-spatial-and-visual-03	B	8 edges
puz-spatial-and-visual-04	D	A square with a dot inside it
puz-spatial-and-visual-05	B	8 squares
puz-spatial-and-visual-06	D	Notch at the bottom-right corner; hole near the top edge, slightly left of centre
puz-spatial-and-visual-07	A	A row of four squares, with one square attached above the second and one attached below the third
puz-spatial-and-visual-08	C	14 cubes
puz-spatial-and-visual-09	D	Middle row left column, and top row right column
puz-spatial-and-visual-10	B	A box holding three crosses
puz-spatial-and-visual-11	A	A right-angled triangle whose two shorter sides have different lengths
puz-spatial-and-visual-12	C	Two holes in the left half, one just above and one just below the centre line, each the same distance from it
puz-spatial-and-visual-13	D	A plain hexagon

puz-spatial-and-visual-14	A	An arrow pointing left, with a plain head and a shaded tail
puz-spatial-and-visual-15	B	Capped, notched, plain, striped
puz-spatial-and-visual-16	C	30 rectangles
puz-spatial-and-visual-17	D	Straight up, away from the base
puz-spatial-and-visual-18	A	Four holes, one at the centre of each quarter of the sheet
puz-spatial-and-visual-19	C	A square with one dot
puz-spatial-and-visual-20	B	The square is on top and the arrow faces you
puz-spatial-and-visual-21	D	6 regions
puz-spatial-and-visual-22	A	Facing north, three squares east and two squares north of the start
puz-spatial-and-visual-23	B	Four holes: two of them one unit from the left edge and two of them five units from the left edge, each pair at heights of two and six units
puz-spatial-and-visual-24	D	A shaded circle with five dots
puz-spatial-and-visual-25	C	A horizontal pole with its top end on the left and the flag hanging below near that end

Worked explanations

puz-spatial-and-visual-01: Rotate one arm at a time rather than the whole shape at once. A clockwise quarter turn sends anything pointing up to pointing right, so the tall arm lies down along the top; it sends anything pointing right to pointing down, so the foot now hangs downwards. Both arms still meet at the same corner, which is now the top-left. Putting the bar along the bottom is what a quarter turn the other way produces, and leaving the upright on the right is a mirror image rather than a rotation.

puz-spatial-and-visual-02: A reflection reverses the axis that crosses the mirror line and leaves the axis running along it untouched. This mirror line runs north to south, so east and west swap while north and south stay put: the desk keeps its north wall but slides to the west corner, and the door moves to the middle of the east wall. Moving the desk to the south wall means you reflected across an east-west line instead, and moving only one of the two items means you stopped halfway.

puz-spatial-and-visual-03: Count a solid in groups rather than one edge at a time, so nothing is missed or double counted. There are four edges around the square base, and four sloping edges running from the base corners up to the apex, giving four plus four. The count of five belongs to the faces, not the edges: one square plus four triangles. Twelve is the edge count of a box, which has an extra square face where this solid has only a point.

puz-spatial-and-visual-04: Read a small matrix in two directions: across for what changes, down for what stays. Moving left to right, the outline is unchanged and a dot appears inside it, so the bottom row must keep its square outline and gain a dot in the same place. Keeping the circle means you copied the row above instead of applying its rule, and shading the whole square swaps in a different change from the one the top row demonstrates.

puz-spatial-and-visual-05: Count by size, largest group first, and the total is hard to get wrong. There are six single cells. A two-by-two square needs two adjacent columns, and with three columns there are only two such positions, so two larger squares exist, giving six plus two. Stopping at six means you counted only the single cells; nine comes from assuming there is a two-by-two square starting at each of the three columns, but the one starting at the third column would run off the edge.

puz-spatial-and-visual-06: A half turn moves every point to the position directly opposite it through the centre of the card, which means both directions reverse at once: left becomes right and top becomes bottom. The top-left notch therefore lands at the bottom-right, and a hole that was low and right of centre becomes high and left of centre. Reversing only the up-down sense is a flip over a horizontal line, not a turn, and moving

the notch while leaving the hole low is the commonest slip. Every feature has to travel.

puz-spatial-and-visual-07: Fold the row first and the extras second. A row of four wraps into a closed band of four side faces, which leaves exactly two squares to supply the lid and the base, so those two must hang off different faces of the band and on opposite sides of it. Two squares attached above neighbouring positions both try to become the lid and collide, and a row of five wraps too far, so its fifth square lands on top of the square it started from. A solid block of two rows of three has no row long enough to make a band at all, so it cannot close either end.

puz-spatial-and-visual-08: Count a stack layer by layer, turning each layer's description into a number of cubes before adding anything. A three-by-three layer is nine cubes, a two-by-two layer is four, and the cap is one, so the total is nine plus four plus one. Adding the side lengths instead of the areas gives three plus two plus one, which counts rows rather than cubes; stopping at thirteen means the single cube on top was forgotten; and nine is the base alone, ignoring everything you cannot walk around.

puz-spatial-and-visual-09: Reflecting in the leading diagonal simply swaps each cell's row number with its column number, because that diagonal is the line where the two are equal. Row one, column two becomes row two, column one; row three, column one becomes row one, column three. Reflecting in a vertical line instead would leave both counters in their own rows, and a half turn would send the top counter to the bottom row rather than to the middle row.

puz-spatial-and-visual-10: When a matrix has more than one feature, decide which feature is fixed and which one moves before predicting anything. The mark stays the same all the way along a row, while the count rises by one at each step. The upper row settles the question of what the count does: one, two, three is a steady increase rather than a doubling, so a lower row that reads one, two must continue with three of the same mark. Doubling would give four and only looks plausible if you ignore the third box above.

puz-spatial-and-visual-11: Test a shape for line symmetry by looking for a fold that sends each corner onto another corner of the same kind. A triangle with two equal sides folds along the line through the point where those sides meet; a rectangle folds along either line joining the midpoints of opposite sides; a semicircle folds along the line through the middle of its straight edge. A right-angled triangle with unequal shorter sides has three corners that are all different, so no fold can pair them, and folding along the longest side merely doubles it rather than matching halves.

puz-spatial-and-visual-12: Treat the crease as a mirror and count layers first. The punch passes through two layers, so unfolding must produce two holes, and the second one is the mirror image of the first in the crease line. The crease here runs horizontally across the middle, so the pair sit at equal distances above and below it while their distance from the left edge is untouched. Putting one hole in each half means you mirrored in a vertical line, which is what a left-to-right fold would have created.

puz-spatial-and-visual-13: Split a compound pattern into separate tracks and continue each one on its own. The side count climbs by one at every step, so a row reading four sides then five sides must reach six. The shading alternates plain, shaded, plain, so a step that follows a shaded figure returns to plain. Keeping the shading on is the usual slip, because the eye latches onto the most recent figure instead of the alternation, and repeating five sides ignores the count track altogether.

puz-spatial-and-visual-14: When two features change together, work out how long each one takes to return to its starting state and then use the remainder. Direction repeats every four moves, so three clockwise quarter turns from up gives right, then down, then left. Shading repeats every two moves, and three is an odd number of swaps, so it ends reversed: the head is plain and the tail shaded. Keeping the head shaded treats three swaps as if they cancelled, and stopping at down means only two moves were counted.

puz-spatial-and-visual-15: Moving to the opposite side of a line of objects does not move the objects; it swaps which end of the line is on your left. The order along the ground is fixed, so the second viewer reads exactly the same list backwards, and the post at each end trades places with the post at the other end. Swapping only the outer pair treats the change as a reflection applied to the ends alone, and leaving the list unchanged forgets that your left hand now points the other way along the line.

puz-spatial-and-visual-16: Stop counting shapes and start counting lines. A rectangle is fixed the moment you choose two of the vertical grid lines for its sides and two of the horizontal grid lines for its top and bottom. There are five verticals, which can be paired in ten ways, and three horizontals, which can be paired in three ways, so ten times three gives the total. Counting only the single cells gives eight, counting only the shapes that are squares gives eleven, and stopping at twenty means the full-height rectangles were never paired with the shorter ones.

puz-spatial-and-visual-17: A flap turns about the edge where it meets the base, so ask how each direction drawn on the flap relates to that hinge. Directions running parallel to the hinge are unaffected by the fold, while directions running away from the hinge swing through a quarter turn and end up vertical. The arrow runs directly away from the base, which is directly away from the hinge, so it finishes pointing upwards. Pointing across the box would need the wall to fold past upright and lie flat again, and pointing down would need it to fold the other way, inwards over the base.

puz-spatial-and-visual-18: Count layers, then undo the folds in reverse order, mirroring the whole set of holes in each crease as you go. Two folds make four layers, so a single punch must give four holes. Undoing the vertical crease mirrors the punch left to right; undoing the horizontal crease then mirrors both of those up and down, and because the punch sat at the centre of the folded quarter, the four holes land at the centre of each quarter of the whole sheet. Finding only two holes is the sign that one of the two folds was never undone.

puz-spatial-and-visual-19: This is elimination on two independent features, exactly as you would fill the last cell of a completed table. The bottom row already holds a circle and a triangle, so the missing shape is a square; the same row already holds two dots and three dots, so the missing count is one. Checking down the last column agrees: it holds a circle and a triangle, and counts of three and two. Taking the count from the cell directly above gives a square with three dots, but three has already been used in that column, which is how you catch the error.

puz-spatial-and-visual-20: Take one movement at a time and write out all six positions after each. Tipping forward cycles four faces, top to front to bottom to back to top, and leaves left and right alone, so after the tip the square from the far face is on top and the star faces you. A quarter turn clockwise from above cycles the four side faces, front to left to back to right to front, and leaves top and bottom alone, so the arrow swings round from the right to the front while the square stays on top. Turning the other way would bring the triangle forward instead.

puz-spatial-and-visual-21: Add the lines one at a time and count how many existing regions each new line actually passes through, because a line adds exactly that many regions. The first diagonal makes two regions; the second crosses it and passes through two of them, making four. The third line runs through the same crossing point at the centre, so it passes through only the left and right regions and adds two more, not four. Expecting eight assumes the third line meets the other two at two separate points, which concurrency at the centre prevents.

puz-spatial-and-visual-22: Keep two columns rather than drawing the path: one for the heading, one for the running totals east and north. Update the heading first at every turn, remembering that a right turn runs north to east to south to west, and that when you face south your left hand points east. The legs then total three north, two east, three south, one east, two north, which nets to three east and two north, and the final turn leaves you facing north again. Reading the totals off in the wrong order is what produces two east and three north.

puz-spatial-and-visual-23: Undo the folds in reverse order and mirror the holes in each crease, using the crease line rather than the middle of the sheet. The packet's left edge sits three units in, so a punch two units into it is five units from the left edge of the whole sheet; the packet's foot is the mid-height crease, so a punch two units above it is six units up. Undoing the halving fold mirrors that hole about mid-height, giving a second at a height of two. Undoing the off-centre fold mirrors both about the line three units in, and five is two units past that crease, so its partner is one unit from the edge. Assuming the vertical crease was central gives three and five instead, which is the slip this puzzle is built to catch.

puz-spatial-and-visual-24: When a matrix resists a single reading, test each feature against a different direction. Shape and dot count behave by row: a row keeps one shape throughout and adds a dot at each step, and each row begins one dot higher than the row above, so the bottom row runs three, four, five circles. Shading obeys no row rule at all, and following it cell by cell shows it stepping one place to the right as it moves down, which puts it on the diagonal and therefore on the bottom-right cell. Treating shading as a row feature is what leaves the cell plain.

puz-spatial-and-visual-25: Rotations and reflections do not commute, so apply them strictly in the order given and track two things: where the pole's top end goes, and which side of the pole the flag sits on. The clockwise quarter turn sends up to right and right to down, so the pole lies flat with its top end to the right and the flag hangs below it. The vertical mirror then swaps left and right, moving the top end to the left and carrying the flag with it, while below stays below. Doing the mirror first would put the flag on the left, and the same turn would then send left to up, which is why the flag would stand up instead of hang, the tell-tale sign that the order matters.

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