Spatial reasoning: complete practice bank: open practice pack

100 untimed questions across 10 authored sections.

Detail	Value
Pack	cognitive-skills-spatial-reasoning
Source	cognitive-skills
Pack version	v1
Worksheet items	100
Authored hints	0
Worked explanations	100

> This is untimed educational practice for one cognitive skill. It is not a clinical, diagnostic, employment, or professionally recognized assessment, and it does not produce an IQ score or credential.

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Learner worksheet

One hundred text-described visualisation exercises in ten themed sections, from simple flips to multi-step 3D challenges. Work untimed and picture each move carefully. Every answer comes with a short explanation of the method.

Choose one answer for each item. For a delayed-recall item, read its study text, cover it, and then answer without looking back.

Flips and half-turns

Simple flips and quarter or half turns of flat shapes and letters, picture the move before answering.

1. spatial-reasoning-s01-q01

A rectangular flag has a red top half and a blue bottom half. If the flag is rotated 180° (turned upside down), what color is now on top?

- A. Red
- B. Blue
- C. Half red, half blue
- D. White

Your answer: _____

2. spatial-reasoning-s01-q02

The capital letter N is rotated 180° on the page. What does it look like now?

- A. Exactly like a normal N
- B. A backwards (mirror-image) N
- C. The letter Z

- D. The letter W

Your answer: _____

3. spatial-reasoning-s01-q03

An arrow points to the right. After the arrow is rotated 90° clockwise, which way does it point?

- A. Up
- B. Left
- C. Down
- D. Right

Your answer: _____

4. spatial-reasoning-s01-q04

A square card has a dot in its top-left corner. The card is flipped over left-to-right, like turning the page of a book. Viewed from the new front, where is the dot?

- A. Bottom-left corner
- B. Bottom-right corner
- C. Top-left corner
- D. Top-right corner

Your answer: _____

5. spatial-reasoning-s01-q05

The lowercase letter b is rotated 180° on the page. Which letter does it now resemble?

- A. q
- B. d
- C. p
- D. b

Your answer: _____

6. spatial-reasoning-s01-q06

A triangle points straight upward. It is rotated 180°. Which way does it now point?

- A. Left
- B. Right
- C. Downward
- D. Still upward

Your answer: _____

7. spatial-reasoning-s01-q07

A rectangular photo shows a person standing upright. The photo is rotated 90° anticlockwise. In the rotated photo, the person now appears to be…

- A. Upside down
- B. Lying with their head to the right

- C. Still upright
- D. Lying with their head to the left

Your answer: _____

8. spatial-reasoning-s01-q08

A square tile has a dark stripe running from its bottom-left corner to its top-right corner. After the tile is rotated 90° clockwise, the stripe runs from…

- A. Bottom-left to top-right
- B. Top-left to bottom-right
- C. The middle of the left edge to the middle of the right edge
- D. The middle of the top edge to the middle of the bottom edge

Your answer: _____

9. spatial-reasoning-s01-q09

How many degrees are in three-quarters of a full turn?

- A. 270°
- B. 180°
- C. 90°
- D. 360°

Your answer: _____

10. spatial-reasoning-s01-q10

The digit 6 is rotated 180° on the page. Which digit does it now resemble?

- A. 6
- B. 8
- C. 0
- D. 9

Your answer: _____

Compass directions and turning

Track which compass direction you face after each described turn.

11. spatial-reasoning-s02-q01

You are facing North. You turn 90° clockwise, then another 90° clockwise. Which direction do you now face?

- A. North
- B. South
- C. East
- D. West

Your answer: _____

12. spatial-reasoning-s02-q02

You are facing East. You turn 90° anticlockwise. Which direction are you now facing?

- A. South
- B. West
- C. East
- D. North

Your answer: _____

13. spatial-reasoning-s02-q03

You face South and make a three-quarter turn (270°) clockwise. Which direction do you now face?

- A. East
- B. West
- C. North
- D. South

Your answer: _____

14. spatial-reasoning-s02-q04

A weathervane arrow points North-East. The wind swings it 90° clockwise. Where does it point now?

- A. North-West
- B. South-West
- C. South-East
- D. North-East

Your answer: _____

15. spatial-reasoning-s02-q05

You are facing West. You turn 180°, then 90° clockwise. Which direction are you facing?

- A. North
- B. East
- C. South
- D. West

Your answer: _____

16. spatial-reasoning-s02-q06

You stand facing North. Which compass direction is directly to your right?

- A. East
- B. West
- C. South
- D. North

Your answer: _____

17. spatial-reasoning-s02-q07

You face North and turn clockwise through 450°. Which direction do you face?

- A. North
- B. West
- C. South
- D. East

Your answer: _____

18. spatial-reasoning-s02-q08

Facing South-West, you turn 180°. Which direction do you now face?

- A. South-East
- B. North-East
- C. North-West
- D. South

Your answer: _____

19. spatial-reasoning-s02-q09

You make four 90° clockwise turns in a row. Compared with your starting direction, which way are you now facing?

- A. The opposite direction
- B. 90° to the right of where you started
- C. 90° to the left of where you started
- D. Exactly the same direction as you started

Your answer: _____

20. spatial-reasoning-s02-q10

You face East. You turn 90° clockwise, then 180°, then 90° clockwise again. Which direction do you face?

- A. East
- B. North
- C. South
- D. West

Your answer: _____

Routes and displacement

Follow each route step by step and work out the finishing position relative to the start.

21. spatial-reasoning-s03-q01

You walk 3 blocks north, then 4 blocks east, then 3 blocks south. Relative to your starting point, where are you now?

- A. 4 blocks north
- B. 4 blocks east
- C. 4 blocks south

- D. 4 blocks west

Your answer: _____

22. spatial-reasoning-s03-q02

You walk 5 blocks east, then 2 blocks west. How far are you from your starting point, and in which direction?

- A. 7 blocks east
- B. 3 blocks west
- C. 3 blocks east
- D. 2 blocks east

Your answer: _____

23. spatial-reasoning-s03-q03

A delivery cyclist rides 2 km north, then 2 km east, then 2 km south, then 2 km west. Where does she finish relative to her start?

- A. Back at the starting point
- B. 2 km north of the start
- C. 2 km east of the start
- D. 4 km from the start

Your answer: _____

24. spatial-reasoning-s03-q04

You walk 6 metres south, then 8 metres west. Measured in a straight line, how far are you from your starting point?

- A. 14 metres
- B. 7 metres
- C. 8 metres
- D. 10 metres

Your answer: _____

25. spatial-reasoning-s03-q05

Starting at her front door, Amara walks 4 blocks north, then 1 block east, then 1 more block north. How many blocks north of her door is she?

- A. 5
- B. 4
- C. 6
- D. 1

Your answer: _____

26. spatial-reasoning-s03-q06

You walk 3 blocks west, 2 blocks north, 3 blocks east, and 2 blocks north. Where are you relative to your starting point?

- A. 3 blocks west
- B. 2 blocks north
- C. 4 blocks east
- D. 4 blocks north

Your answer: _____

27. spatial-reasoning-s03-q07

A robot on a square grid starts facing north. It repeats this loop twice: move forward 2 squares, turn 90° clockwise, move forward 1 square, turn 90° clockwise. Where does it finish relative to its starting square?

- A. 2 squares north
- B. 1 square east
- C. Back on its starting square
- D. 2 squares south

Your answer: _____

28. spatial-reasoning-s03-q08

From camp, a hiker walks 5 km east, then 3 km north, then 5 km west. In a straight line, how far and in which direction must she walk to return to camp?

- A. 3 km south
- B. 3 km north
- C. 5 km west
- D. 8 km south-west

Your answer: _____

29. spatial-reasoning-s03-q09

A taxi drives 1 km south, 2 km east, 3 km north, 2 km west, and finally 1 km south. Where does it finish relative to where it started?

- A. Back at the start
- B. 1 km south
- C. 2 km east
- D. 1 km north

Your answer: _____

30. spatial-reasoning-s03-q10

A square walking trail has corners at its north-west, north-east, south-east, and south-west. You start at the south-west corner and walk clockwise around the trail exactly three-quarters of the way. At which corner do you stop?

- A. North-west
- B. North-east
- C. South-east
- D. South-west

Your answer: _____

Mirror images and reflections

Decide how letters, words, and objects appear when reflected in a mirror.

31. spatial-reasoning-s04-q01

Which of these capital letters looks exactly the same when reflected left-to-right in a vertical mirror?

- A. A
- B. F
- C. J
- D. N

Your answer: _____

32. spatial-reasoning-s04-q02

The capital letter E is reflected in a vertical mirror. Which way do its three horizontal arms now point?

- A. Upward
- B. Right
- C. Left
- D. Downward

Your answer: _____

33. spatial-reasoning-s04-q03

You raise your right hand while facing a mirror. Which hand does your reflection appear to raise?

- A. Its right hand
- B. Its left hand
- C. Both hands
- D. Neither hand

Your answer: _____

34. spatial-reasoning-s04-q04

Which pair of lowercase letters are mirror images of each other across a vertical mirror line?

- A. m and w
- B. n and u
- C. f and t
- D. b and d

Your answer: _____

35. spatial-reasoning-s04-q05

The word BOX is painted on the outside of a shop window. Read from inside the shop, what does it look like?

- A. BOX, exactly as normal
- B. XOB, with the B appearing reversed
- C. BOX upside down
- D. XOB, with every letter looking normal

Your answer: _____

36. spatial-reasoning-s04-q06

An analogue clock with no numerals shows exactly 3:00 (minute hand at the 12 position, hour hand at the 3 position). Viewed in a mirror, what time does it appear to show?

- A. 9:00
- B. 3:00
- C. 6:00
- D. 12:45

Your answer: _____

37. spatial-reasoning-s04-q07

Which of these capital letters does NOT look the same after being reflected in a vertical mirror?

- A. H
- B. O
- C. T
- D. G

Your answer: _____

38. spatial-reasoning-s04-q08

A left-hand glove is reflected in a mirror. What does the reflection show?

- A. A left-hand glove
- B. A glove that fits neither hand
- C. A right-hand glove
- D. The same glove rotated 180°

Your answer: _____

39. spatial-reasoning-s04-q09

The word MUM is written in capital letters. Reflected in a vertical mirror, it reads…

- A. WUW
- B. MUM, unchanged
- C. MUM upside down
- D. UMM

Your answer: _____

40. spatial-reasoning-s04-q10

The lowercase letter p is reflected in a horizontal mirror (flipped top-to-bottom). Which letter does it now resemble?

- A. b
- B. q
- C. d
- D. p

Your answer: _____

Paper folding and hole punching

Fold the paper in your mind, punch or cut, then unfold to count and place the holes.

41. spatial-reasoning-s05-q01

A square sheet of paper is folded in half left-to-right, then folded in half again top-to-bottom. A hole is punched through all layers at the folded corner. How many holes appear when the paper is fully unfolded?

- A. 1
- B. 2
- C. 4
- D. 8

Your answer: _____

42. spatial-reasoning-s05-q02

A sheet of paper is folded in half once. A hole is punched through both layers. How many holes are there when the sheet is unfolded?

- A. 2
- B. 1
- C. 4
- D. 3

Your answer: _____

43. spatial-reasoning-s05-q03

A square sheet is folded in half three times, then a hole is punched through every layer. How many holes appear when the sheet is fully unfolded?

- A. 3
- B. 4
- C. 6
- D. 8

Your answer: _____

44. spatial-reasoning-s05-q04

A square sheet is folded in half left-to-right. A hole is punched close to the folded (creased) edge. When the sheet is unfolded, the two holes will be…

- A. Far apart, near the outer edges
- B. Close together, one either side of the centre crease
- C. In exactly the same spot, forming one hole
- D. In opposite corners

Your answer: _____

45. spatial-reasoning-s05-q05

A square sheet is folded in half top-to-bottom, so the fold crease lies along the top of the folded rectangle. A hole is punched through both layers near the top-right of the folded rectangle. When unfolded, where are the holes?

- A. Both in the top-right corner
- B. One in the top-right corner and one in the bottom-right corner
- C. Two holes on the left side near the centre
- D. Two holes on the right side, just above and just below the horizontal centre crease

Your answer: _____

46. spatial-reasoning-s05-q06

A square sheet is folded in half twice, making four layers. A hole is punched through only the top two of the four layers. How many holes are there when the sheet is unfolded?

- A. 2
- B. 4
- C. 1
- D. 3

Your answer: _____

47. spatial-reasoning-s05-q07

A square sheet of paper is folded along its diagonal to make a triangle. A hole is punched through both layers at the centre of the triangle. When unfolded, how many holes are there and how are they arranged?

- A. 1 hole in the exact centre of the square
- B. 2 holes, mirror images either side of the diagonal crease
- C. 4 holes, one in each quarter of the square
- D. 2 holes in the same corner

Your answer: _____

48. spatial-reasoning-s05-q08

Each fold of a sheet doubles the number of layers. After four folds, a hole is punched through every layer. How many holes appear when the sheet is unfolded?

- A. 4
- B. 6
- C. 8
- D. 16

Your answer: _____

49. spatial-reasoning-s05-q09

A square sheet is folded in half by bringing its left edge across to its right edge. A small triangle is then snipped off the top corner on the creased side. What does the cut look like when the sheet is opened out flat?

- A. One triangular notch centred on the middle of the top edge

- B. Two separate notches at the two top corners
- C. A notch at the top-right corner only
- D. A diamond-shaped hole in the middle of the sheet

Your answer: _____

50. spatial-reasoning-s05-q10

A square sheet is folded in half top-to-bottom, then in half left-to-right, giving four layers. One hole is punched through all four layers away from any fold or edge. Then a second hole is punched in a different spot through the top layer only. How many holes are in the sheet once it is fully unfolded?

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

Your answer: _____

Cube faces and rotations

Keep track of a cube's faces as it spins, tips, and rolls.

51. spatial-reasoning-s06-q01

A cube has letter A on top, letter B on the front face, and letter C on the right face. If the cube is rotated 90° clockwise around the vertical axis (viewed from above), which letter is now on the front face?

- A. A
- B. B
- C. C
- D. Cannot be determined

Your answer: _____

52. spatial-reasoning-s06-q02

On a standard die, opposite faces always add up to 7. If the 3 is on top, which number is on the bottom face?

- A. 3
- B. 4
- C. 5
- D. 2

Your answer: _____

53. spatial-reasoning-s06-q03

A cube has a star on its top face. The cube is tilted toward you by 90°, so the top face swings down to face you directly. Where is the star now?

- A. On the face directly facing you
- B. On the bottom face
- C. On the back face
- D. Still on the top face

Your answer: _____

54. spatial-reasoning-s06-q04

A cube has the number 1 on its front face and 2 on its top face. The cube is rotated 180° about its vertical axis. Where is the 1 now?

- A. Still on the front face
- B. On the top face
- C. On the right face
- D. On the back face

Your answer: _____

55. spatial-reasoning-s06-q05

A die shows 5 on top and 3 on the face toward you. The die is rolled one face to the right, tipping over its bottom-right edge. Which number now faces you?

- A. 3
- B. 5
- C. 2
- D. It cannot be determined

Your answer: _____

56. spatial-reasoning-s06-q06

A cube has a red top face, a blue bottom face, and a green face toward you. The cube is rolled 90° away from you, tipping over its far bottom edge. Which colour is now on top?

- A. Red
- B. Blue
- C. White
- D. Green

Your answer: _____

57. spatial-reasoning-s06-q07

On a standard die (opposite faces sum to 7), the 2 faces you and the 6 is on top. Which number is on the face pointing directly away from you?

- A. 1
- B. 5
- C. 6
- D. 4

Your answer: _____

58. spatial-reasoning-s06-q08

A cube has a different letter on each of its six faces, with P on top. If the cube is only ever spun about its vertical axis (P stays on top), how many different faces can be brought round to face you?

- A. 4

- B. 3
- C. 5
- D. 6

Your answer: _____

59. spatial-reasoning-s06-q09

A cube shows 4 on top and 1 on the face toward you. It is first rotated 90° clockwise about its vertical axis (viewed from above), then tilted toward you by 90° so the top face swings down to face you. Which number faces you now?

- A. 1
- B. 6
- C. 3
- D. 4

Your answer: _____

60. spatial-reasoning-s06-q10

Two opposite faces of a cube are painted red and the remaining four faces are painted white. How many of the cube's 12 edges lie between one red face and one white face?

- A. 4
- B. 8
- C. 12
- D. 6

Your answer: _____

Nets and cube assembly

Fold flat nets into cubes and reason about which faces touch or oppose each other.

61. spatial-reasoning-s07-q01

A cube net is a vertical strip of four squares numbered 1 to 4 from top to bottom, with square 5 attached to the left of square 2 and square 6 attached to the right of square 2. When it is folded into a cube, which face is opposite face 2?

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

Your answer: _____

62. spatial-reasoning-s07-q02

A cube net is a vertical strip of four squares numbered 1 to 4 from top to bottom, with square 5 attached to the left of square 2 and square 6 attached to the right of square 2. When it is folded into a cube, which face is opposite face 5?

- A. 6
- B. 3

- C. 1
- D. 4

Your answer: _____

63. spatial-reasoning-s07-q03

Six identical squares are joined edge-to-edge in one straight row. Can this shape fold up into a cube?

- A. Yes: any six joined squares can fold into a cube
- B. No: the strip wraps around on itself, overlapping some faces and leaving two uncovered
- C. Yes, but only if it is folded in alternating directions
- D. It cannot be determined from the description

Your answer: _____

64. spatial-reasoning-s07-q04

A cube net has a horizontal row of three squares (L (left), C (centre), R (right)) with a column of three more squares C1, C2, C3 hanging directly below C, in that order. After folding into a cube, which face does NOT share an edge with face L?

- A. C
- B. C1
- C. R
- D. C3

Your answer: _____

65. spatial-reasoning-s07-q05

On a flat cube net, a heart is printed on one square and an arrow on a square that shares an edge with it. After the net is folded into a cube, the heart face and the arrow face will…

- A. Share an edge on the cube
- B. Be on opposite faces
- C. End up on the same face
- D. Possibly touch or not, depending on the rest of the net

Your answer: _____

66. spatial-reasoning-s07-q06

Six squares are arranged in a solid 2x3 rectangle (two rows of three). Can this shape fold up into a cube?

- A. Yes: it folds neatly into a cube
- B. Only if it is folded anticlockwise
- C. Only into an open-topped box
- D. No: some faces would overlap while others were left uncovered

Your answer: _____

67. spatial-reasoning-s07-q07

A cross-shaped cube net has a centre square X with squares N, E, S, and W attached to its four sides, and one more square B attached below S. When folded, which face ends up opposite X?

- A. N
- B. S
- C. B
- D. E

Your answer: _____

68. spatial-reasoning-s07-q08

A cross-shaped cube net has a centre square X with squares N, E, S, and W attached to its four sides, and one more square B attached below S. When folded, which face ends up opposite E?

- A. N
- B. W
- C. X
- D. B

Your answer: _____

69. spatial-reasoning-s07-q09

Eight identical small cubes are glued together into one larger 2x2x2 cube. How many faces of each small cube are visible on the outside of the large cube?

- A. 3
- B. 2
- C. 4
- D. 1

Your answer: _____

70. spatial-reasoning-s07-q10

A die is folded from a net so that 1 is opposite 6, 2 is opposite 5, and 3 is opposite 4. The faces 1, 2, and 3 meet at one corner of the die. Which three faces meet at the diagonally opposite corner?

- A. 1, 5, and 4
- B. 6, 2, and 4
- C. 4, 5, and 6
- D. 1, 2, and 3

Your answer: _____

Painted solids and block counting

Count cubes, painted faces, and visible surfaces in assembled block shapes.

71. spatial-reasoning-s08-q01

A cube is painted red on all six faces, then cut into 27 equal smaller cubes (a 3x3x3 grid). How many of the small cubes have paint on exactly two faces?

- A. 6
- B. 8
- C. 12
- D. 24

Your answer: _____

72. spatial-reasoning-s08-q02

A cube is painted on all six faces and cut into 27 equal smaller cubes (a 3x3x3 grid). How many of the small cubes have paint on exactly three faces?

- A. 8
- B. 12
- C. 6
- D. 1

Your answer: _____

73. spatial-reasoning-s08-q03

A 4x4x4 cube is painted on all six faces and cut into 64 equal small cubes. How many small cubes have paint on exactly two faces?

- A. 12
- B. 32
- C. 16
- D. 24

Your answer: _____

74. spatial-reasoning-s08-q04

A cube is painted on all six faces and cut into 27 equal smaller cubes (a 3x3x3 grid). How many of the small cubes have paint on exactly one face?

- A. 8
- B. 6
- C. 12
- D. 4

Your answer: _____

75. spatial-reasoning-s08-q05

A staircase shape is built from identical cubes: a bottom row of 3 cubes, a row of 2 cubes stacked on the back two, and 1 cube on top of the back one. How many cubes are used in total?

- A. 5
- B. 7
- C. 8
- D. 6

Your answer: _____

76. spatial-reasoning-s08-q06

A staircase shape is built from identical cubes: a bottom row of 3 cubes running away from you, 2 cubes stacked on the two farthest, and 1 cube on top of the farthest one. Looking straight down from above, how many squares do you see?

- A. 3
- B. 6
- C. 5
- D. 1

Your answer: _____

77. spatial-reasoning-s08-q07

A staircase shape is built from identical cubes: a bottom row of 3 cubes running away from you, 2 cubes stacked on the two farthest, and 1 cube on top of the farthest one. Viewed exactly side-on, how many unit squares make up its silhouette?

- A. 3
- B. 6
- C. 5
- D. 9

Your answer: _____

78. spatial-reasoning-s08-q08

A 2x2x2 cube built from 8 small cubes is painted on all outside faces. How many of the small cubes have paint on exactly three faces?

- A. 8
- B. 4
- C. 6
- D. 2

Your answer: _____

79. spatial-reasoning-s08-q09

A 3x3x3 cube of 27 small cubes sits on a table and is painted on every face except the bottom, which stays unpainted against the table. How many small cubes end up with no paint at all?

- A. 1
- B. 0
- C. 3
- D. 2

Your answer: _____

80. spatial-reasoning-s08-q10

A shape is built from unit cubes: a flat 3x3 layer of 9 cubes on a table, with 1 more cube placed on the centre of the top. Counting every visible cube face (the faces against the table are hidden), how many faces can be seen from outside?

- A. 22
- B. 25
- C. 26
- D. 24

Your answer: _____

Views, plans, and cross-sections

Match solids to their top, front, and side views, and predict cross-section shapes.

81. spatial-reasoning-s09-q01

A cylindrical tin stands upright on a table. Viewed from directly above, what shape do you see?

- A. A rectangle
- B. A circle
- C. An oval
- D. A square

Your answer: _____

82. spatial-reasoning-s09-q02

A cylindrical tin stands upright on a shelf. Viewed straight on from the side, what is the outline of its silhouette?

- A. A circle
- B. A triangle
- C. An oval
- D. A rectangle

Your answer: _____

83. spatial-reasoning-s09-q03

A pyramid with a square base sits on that base. Viewed straight on from the front at table height, what is its silhouette?

- A. A triangle
- B. A square
- C. A pentagon
- D. A circle

Your answer: _____

84. spatial-reasoning-s09-q04

A cone is sliced by a flat cut parallel to its base, partway up. What is the shape of the newly cut surface?

- A. A triangle
- B. An ellipse
- C. A circle
- D. A semicircle

Your answer: _____

85. spatial-reasoning-s09-q05

A cube is cut exactly in half by a vertical plane passing through two opposite vertical edges (so the cut runs along the diagonals of the top and bottom faces). What is the shape of the cut surface?

- A. A square
- B. A triangle

- C. A hexagon
- D. A rectangle that is wider than it is tall

Your answer: _____

86. spatial-reasoning-s09-q06

A solid sphere is cut by a flat plane, anywhere and at any angle. The cut surface is always…

- A. A circle
- B. An ellipse
- C. A shape that depends on the angle of the cut
- D. A ring

Your answer: _____

87. spatial-reasoning-s09-q07

A solid object's view from directly above is a circle, and its view from the front is a triangle. Which solid fits both views?

- A. A cylinder
- B. A sphere
- C. A cone
- D. A cube

Your answer: _____

88. spatial-reasoning-s09-q08

A solid object's views from above, from the front, and from the side are all identical squares. Which solid fits?

- A. A square-based pyramid
- B. A cube
- C. A cylinder
- D. A cone

Your answer: _____

89. spatial-reasoning-s09-q09

One corner of a cube is sliced off by a flat cut passing through the three vertices nearest that corner. What is the shape of the cut surface?

- A. A right-angled triangle
- B. A square
- C. An isosceles triangle that is not equilateral
- D. An equilateral triangle

Your answer: _____

90. spatial-reasoning-s09-q10

A ring doughnut (torus) lies flat on a table. Viewed from directly above, what do you see?

- A. A ring: one circle inside another

- B. A single solid circle
- C. An oval
- D. A figure of eight

Your answer: _____

Multi-step visualisation challenges

Combined, multi-step visualisation problems. Take them one transformation at a time.

91. spatial-reasoning-s10-q01

A standard die (opposite faces always sum to 7) rests with 1 on top and 2 on the face nearest you. It is rolled 90° away from you twice, tipping over its far bottom edge each time. Which number is on top after the second roll?

- A. 6
- B. 1
- C. 5
- D. 3

Your answer: _____

92. spatial-reasoning-s10-q02

You are reading a map with north at the top. You rotate the map 90° anticlockwise. Which compass direction now points toward the top of the map?

- A. West
- B. South
- C. East
- D. North

Your answer: _____

93. spatial-reasoning-s10-q03

An ant walks on the outside of a cube with 1-metre edges, from one corner to the corner diagonally opposite (through the cube's centre if it could tunnel). Staying on the surface and taking the shortest possible route, how far does it walk?

- A. 3 metres
- B. 2 metres
- C. About 1.73 metres (?3)
- D. About 2.24 metres (?5)

Your answer: _____

94. spatial-reasoning-s10-q04

A cube shows a different symbol on each face. From your viewpoint you can see the star (front face), the moon (top face), and the sun (right face). The cube is rotated 180° about its vertical axis. Which of those three symbols can you still see?

- A. The star and the moon
- B. Only the moon

- C. Only the sun
- D. None of them

Your answer: _____

95. spatial-reasoning-s10-q05

An analogue clock shows exactly 3:00. If you turn the whole clock upside down (rotate it 180°), what time does it appear most like?

- A. 3:00
- B. 6:15
- C. 9:30
- D. 12:45

Your answer: _____

96. spatial-reasoning-s10-q06

A transparent sheet of film is printed with the letter R. The film is flipped over left-to-right, then rotated 180°. What does the R look like now?

- A. An R flipped top-to-bottom
- B. A normal R
- C. An R mirrored left-to-right
- D. An R rotated 90°

Your answer: _____

97. spatial-reasoning-s10-q07

You start facing north. You walk 10 m forward, turn 90° clockwise, walk 10 m, turn 90° clockwise again, and walk 10 m. Which direction are you facing, and where are you relative to your start?

- A. Facing north, 10 m west of the start
- B. Facing south, 10 m north of the start
- C. Facing east, 10 m east of the start
- D. Facing south, 10 m east of the start

Your answer: _____

98. spatial-reasoning-s10-q08

A cube with 3 cm edges is dipped fully in paint, dried, then cut into 1 cm cubes, and all 27 small cubes are dropped into a bag. Among the cubes in the bag, which number of painted faces is the most common?

- A. 3 painted faces
- B. 2 painted faces
- C. 1 painted face
- D. 0 painted faces

Your answer: _____

99. spatial-reasoning-s10-q09

A cube is rotated 90° clockwise about its vertical axis three times in a row. This has the same result as which single rotation?

- A. 90° clockwise
- B. 180°
- C. 90° anticlockwise
- D. 360° (a full turn)

Your answer: _____

100. spatial-reasoning-s10-q10

A cube has 1 on top, 6 on the bottom, 2 facing north, 5 facing south, 3 facing east, and 4 facing west. It rolls one face-length toward the east, then one face-length toward the north. Which number is on top after both rolls?

- A. 2
- B. 1
- C. 3
- D. 5

Your answer: _____

Authored hints

This cognitive practice source does not publish authored hints. Every item is listed as missing a hint, and no hint text is generated or inferred.

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

Answer key

> The answer key and worked explanations in this file belong only to this public, untimed educational practice source. No active aptitude suite or Novus Reasoning Challenge answer key is ever included in any download.

Spatial reasoning: complete practice bank: open practice pack answer key

Item	Choice	Answer
spatial-reasoning-s01-q01	B	Blue
spatial-reasoning-s01-q02	A	Exactly like a normal N
spatial-reasoning-s01-q03	C	Down
spatial-reasoning-s01-q04	D	Top-right corner
spatial-reasoning-s01-q05	A	q
spatial-reasoning-s01-q06	C	Downward
spatial-reasoning-s01-q07	D	Lying with their head to the left
spatial-reasoning-s01-q08	B	Top-left to bottom-right
spatial-reasoning-s01-q09	A	270°
spatial-reasoning-s01-q10	D	9
spatial-reasoning-s02-q01	B	South

spatial-reasoning-s02-q02	D	North
spatial-reasoning-s02-q03	A	East
spatial-reasoning-s02-q04	C	South-East
spatial-reasoning-s02-q05	C	South
spatial-reasoning-s02-q06	A	East
spatial-reasoning-s02-q07	D	East
spatial-reasoning-s02-q08	B	North-East
spatial-reasoning-s02-q09	D	Exactly the same direction as you started
spatial-reasoning-s02-q10	A	East
spatial-reasoning-s03-q01	B	4 blocks east
spatial-reasoning-s03-q02	C	3 blocks east
spatial-reasoning-s03-q03	A	Back at the starting point
spatial-reasoning-s03-q04	D	10 metres
spatial-reasoning-s03-q05	A	5
spatial-reasoning-s03-q06	D	4 blocks north
spatial-reasoning-s03-q07	C	Back on its starting square
spatial-reasoning-s03-q08	A	3 km south
spatial-reasoning-s03-q09	D	1 km north
spatial-reasoning-s03-q10	C	South-east
spatial-reasoning-s04-q01	A	A
spatial-reasoning-s04-q02	C	Left
spatial-reasoning-s04-q03	B	Its left hand
spatial-reasoning-s04-q04	D	b and d
spatial-reasoning-s04-q05	B	XOB, with the B appearing reversed
spatial-reasoning-s04-q06	A	9:00
spatial-reasoning-s04-q07	D	G
spatial-reasoning-s04-q08	C	A right-hand glove
spatial-reasoning-s04-q09	B	MUM, unchanged
spatial-reasoning-s04-q10	A	b
spatial-reasoning-s05-q01	C	4
spatial-reasoning-s05-q02	A	2
spatial-reasoning-s05-q03	D	8
spatial-reasoning-s05-q04	B	Close together, one either side of the centre crease
spatial-reasoning-s05-q05	D	Two holes on the right side, just above and just below the horizontal centre crease
spatial-reasoning-s05-q06	A	2
spatial-reasoning-s05-q07	B	2 holes, mirror images either side of the diagonal crease
spatial-reasoning-s05-q08	D	16
spatial-reasoning-s05-q09	A	One triangular notch centred on the middle of the top edge
spatial-reasoning-s05-q10	B	5

spatial-reasoning-s06-q01	C	C
spatial-reasoning-s06-q02	B	4
spatial-reasoning-s06-q03	A	On the face directly facing you
spatial-reasoning-s06-q04	D	On the back face
spatial-reasoning-s06-q05	A	3
spatial-reasoning-s06-q06	D	Green
spatial-reasoning-s06-q07	B	5
spatial-reasoning-s06-q08	A	4
spatial-reasoning-s06-q09	D	4
spatial-reasoning-s06-q10	B	8
spatial-reasoning-s07-q01	D	4
spatial-reasoning-s07-q02	A	6
spatial-reasoning-s07-q03	B	No: the strip wraps around on itself, overlapping some faces and leaving two uncovered
spatial-reasoning-s07-q04	C	R
spatial-reasoning-s07-q05	A	Share an edge on the cube
spatial-reasoning-s07-q06	D	No: some faces would overlap while others were left uncovered
spatial-reasoning-s07-q07	C	B
spatial-reasoning-s07-q08	B	W
spatial-reasoning-s07-q09	A	3
spatial-reasoning-s07-q10	C	4, 5, and 6
spatial-reasoning-s08-q01	C	12
spatial-reasoning-s08-q02	A	8
spatial-reasoning-s08-q03	D	24
spatial-reasoning-s08-q04	B	6
spatial-reasoning-s08-q05	D	6
spatial-reasoning-s08-q06	A	3
spatial-reasoning-s08-q07	B	6
spatial-reasoning-s08-q08	A	8
spatial-reasoning-s08-q09	D	2
spatial-reasoning-s08-q10	B	25
spatial-reasoning-s09-q01	B	A circle
spatial-reasoning-s09-q02	D	A rectangle
spatial-reasoning-s09-q03	A	A triangle
spatial-reasoning-s09-q04	C	A circle
spatial-reasoning-s09-q05	D	A rectangle that is wider than it is tall
spatial-reasoning-s09-q06	A	A circle
spatial-reasoning-s09-q07	C	A cone
spatial-reasoning-s09-q08	B	A cube
spatial-reasoning-s09-q09	D	An equilateral triangle

spatial-reasoning-s09-q10	A	A ring: one circle inside another
spatial-reasoning-s10-q01	A	6
spatial-reasoning-s10-q02	C	East
spatial-reasoning-s10-q03	D	About 2.24 metres (?5)
spatial-reasoning-s10-q04	B	Only the moon
spatial-reasoning-s10-q05	C	9:30
spatial-reasoning-s10-q06	A	An R flipped top-to-bottom
spatial-reasoning-s10-q07	D	Facing south, 10 m east of the start
spatial-reasoning-s10-q08	B	2 painted faces
spatial-reasoning-s10-q09	C	90° anticlockwise
spatial-reasoning-s10-q10	D	5

Worked explanations

spatial-reasoning-s01-q01: A 180° turn swaps top and bottom, so the blue half is now on top.

spatial-reasoning-s01-q02: N has half-turn symmetry: rotating it 180° maps each vertical stroke onto the other and the diagonal onto itself, so it looks unchanged.

spatial-reasoning-s01-q03: A quarter turn clockwise moves 'right' round to 'down': follow the arrowhead a quarter of the way round a clock face.

spatial-reasoning-s01-q04: A left-to-right flip swaps left and right but leaves top and bottom alone, so a top-left dot appears at the top-right.

spatial-reasoning-s01-q05: A half-turn flips a shape both top-to-bottom and left-to-right at once, which turns b into q (a mirror flip alone would give d).

spatial-reasoning-s01-q06: A half-turn reverses a shape's direction, so an upward point swings round to point downward.

spatial-reasoning-s01-q07: Rotating the photo 90° anticlockwise carries its top edge round to the left, so the person's head, originally at the top, ends up on the left.

spatial-reasoning-s01-q08: Each corner moves one position round in a quarter turn: bottom-left goes to top-left and top-right goes to bottom-right, so the stripe now lies along the other diagonal.

spatial-reasoning-s01-q09: A full turn is 360°, so three-quarters of it is 360 x 3/4 = 270°.

spatial-reasoning-s01-q10: A half-turn flips the figure top-to-bottom and left-to-right together, turning the tail-up loop of a 6 into the tail-down loop of a 9.

spatial-reasoning-s02-q01: Two 90° clockwise turns total 180°, which points you directly opposite North: South.

spatial-reasoning-s02-q02: Anticlockwise runs against the compass order N-E-S-W, so one quarter turn from East goes back to North.

spatial-reasoning-s02-q03: Step through the quarter turns: South to West (90°), West to North (180°), North to East (270°). A 270° clockwise turn is also just 90° anticlockwise.

spatial-reasoning-s02-q04: Rotate each half of the direction a quarter turn: North becomes East and East becomes South, so North-East becomes South-East.

spatial-reasoning-s02-q05: The 180° turn takes West to East; a further quarter turn clockwise takes East to South.

spatial-reasoning-s02-q06: Facing North puts the compass order N-E-S-W running clockwise from ahead of

you, so East sits at your right hand.

spatial-reasoning-s02-q07: Subtract full turns first: 450° - 360° leaves 90° clockwise, which takes North to East.

spatial-reasoning-s02-q08: A half-turn gives the exact opposite direction: reverse both parts, so South-West becomes North-East.

spatial-reasoning-s02-q09: Four quarter turns add up to 360°: one complete revolution back to the start.

spatial-reasoning-s02-q10: Add the turns: 90° + 180° + 90° = 360°, a full revolution, so you finish facing East just as you began.

spatial-reasoning-s03-q01: The 3 blocks north and 3 blocks south cancel out, leaving only the 4 blocks east.

spatial-reasoning-s03-q02: Opposite directions partly cancel: 5 east minus 2 west leaves a net 3 blocks east.

spatial-reasoning-s03-q03: North cancels south and east cancels west: the four equal legs trace a closed square back to the start.

spatial-reasoning-s03-q04: The two legs are at right angles, so the straight-line distance is the hypotenuse: $\sqrt{(6^2 + 8^2)} = \sqrt{100} = 10$ metres.

spatial-reasoning-s03-q05: Only the north-south legs count toward northward distance: 4 + 1 = 5 blocks north. The eastward block shifts her sideways, not north.

spatial-reasoning-s03-q06: The 3 west and 3 east cancel, while the two northward legs add: 2 + 2 = 4 blocks north.

spatial-reasoning-s03-q07: The first loop takes it 2 north and 1 east, leaving it facing south; the second loop repeats the same moves in the opposite direction, 2 south and 1 west, returning it to the start.

spatial-reasoning-s03-q08: The east and west legs cancel, leaving her 3 km north of camp, so the way home is 3 km due south.

spatial-reasoning-s03-q09: Tally each axis separately: east 2 - west 2 = 0, and north 3 - south (1 + 1) = 1 km north.

spatial-reasoning-s03-q10: Clockwise from the south-west corner visits north-west (one quarter), north-east (half-way), then south-east at the three-quarter mark.

spatial-reasoning-s04-q01: A letter survives a vertical-mirror reflection only if its left and right halves already mirror each other: true of A, but not of F, J, or N.

spatial-reasoning-s04-q02: A vertical mirror swaps left and right, so arms that normally extend to the right now extend to the left.

spatial-reasoning-s04-q03: A mirror swaps left and right from the viewer's perspective, so the raised hand appears on the reflection's left side.

spatial-reasoning-s04-q04: Reflecting b across a vertical line gives d. The pairs m/w and n/u are related by flipping upside down, not by mirroring.

spatial-reasoning-s04-q05: Seen from behind, the letters appear in reverse order and each one is mirrored; X and O are symmetric so they look unchanged, but B shows its reversed form.

spatial-reasoning-s04-q06: A mirror reflects the face across its vertical axis: the 12 position stays put while the 3 position swaps with the 9, so the clock appears to read 9:00.

spatial-reasoning-s04-q07: H, O, and T are symmetric about a vertical centre line, so they survive the reflection; G is not, so its mirror image looks reversed.

spatial-reasoning-s04-q08: Reflection reverses handedness: no rotation can turn a left glove into a right one, but a mirror does exactly that.

spatial-reasoning-s04-q09: The mirror reverses the letter order, but M-U-M reads the same backwards, and each of M and U is itself symmetric about a vertical line, so nothing visibly changes.

spatial-reasoning-s04-q10: A horizontal mirror swaps top and bottom while keeping left and right, turning the descending stem of p into the ascending stem of b (a vertical mirror would give q instead).

spatial-reasoning-s05-q01: Two folds create 4 layers of paper at that corner, so punching through all of them leaves 4 holes once unfolded.

spatial-reasoning-s05-q02: One fold gives two layers; a punch through both layers pierces the paper in two places.

spatial-reasoning-s05-q03: Each fold doubles the layers: 2, then 4, then 8. A punch through all 8 layers leaves 8 holes.

spatial-reasoning-s05-q04: Unfolding reflects the punched hole across the crease, so a punch near the fold produces two mirror-image holes sitting close to the centre line.

spatial-reasoning-s05-q05: The crease is the sheet's horizontal centre line, and the punch sits just below it on the right; unfolding mirrors that hole to just above the line, giving a close pair either side of the crease.

spatial-reasoning-s05-q06: Only the layers actually pierced gain holes. Two layers punched means two holes, however many layers lie beneath.

spatial-reasoning-s05-q07: The triangle's centre is away from the crease, so the punch marks two layers at points that unfold into mirror positions across the diagonal.

spatial-reasoning-s05-q08: Four doublings give 2 x 2 x 2 x 2 = 16 layers, and every pierced layer becomes one hole.

spatial-reasoning-s05-q09: The creased side is the sheet's vertical centre line, so a snip across the crease opens out into a single notch symmetric about the middle of the top edge.

spatial-reasoning-s05-q10: The full-thickness punch marks all four layers (4 holes); the second punch pierces just one layer, adding a single extra hole for 5 in total.

spatial-reasoning-s06-q01: The top face is unaffected by rotation around the vertical axis. A 90° clockwise turn (viewed from above) moves the right face into the front position, so C is now facing front.

spatial-reasoning-s06-q02: Top and bottom are opposite faces, so they must sum to 7: the bottom shows 7 - 3 = 4.

spatial-reasoning-s06-q03: Tilting a cube toward you rotates it about the left-right axis: the top face becomes the front face, carrying the star with it.

spatial-reasoning-s06-q04: A half-turn about the vertical axis swaps front with back (and left with right) while leaving top and bottom in place, so the 1 moves to the back.

spatial-reasoning-s06-q05: Rolling sideways rotates the cube about the axis running from front to back, so the faces toward you and away from you never move, the 3 still faces you.

spatial-reasoning-s06-q06: Rolling away swings the near face upward: green rises to the top while red tips over to become the back face.

spatial-reasoning-s06-q07: The face away from you is opposite the face toward you, so it must be 7 - 2 = 5.

spatial-reasoning-s06-q08: Spinning about the vertical axis cycles the four side faces past you; the top and bottom faces can never come round to the front.

spatial-reasoning-s06-q09: The vertical spin leaves the 4 on top (it only shuffles the side faces); the tilt then carries the top face round to face you, so you see the 4.

spatial-reasoning-s06-q10: Each red face is bordered by four white faces, contributing four red-white edges, and the two red faces share no edge because they are opposite: 4 x 2 = 8.

spatial-reasoning-s07-q01: A strip of four squares wraps into a ring around the cube, so squares two apart in the strip end up on opposite faces: 1 pairs with 3, and 2 pairs with 4.

spatial-reasoning-s07-q02: The strip forms a ring of four faces, and the two side flaps close the remaining

openings on either side, so the flaps 5 and 6 become the cube's two opposite end faces.

spatial-reasoning-s07-q03: Folding a 1x6 strip wraps a band of four faces; the last two squares land on faces already covered, and the two end faces of the cube are never closed.

spatial-reasoning-s07-q04: The column of four squares (C, C1, C2, C3) wraps into a ring, and the two flaps L and R close its opposite openings, opposite faces never share an edge.

spatial-reasoning-s07-q05: Folding never separates squares that are joined: an edge shared in the flat net remains the shared edge of two adjacent faces on the cube.

spatial-reasoning-s07-q06: A valid net must reach all six directions when folded; a solid 2x3 block doubles squares onto the same faces, so the cube can never be closed.

spatial-reasoning-s07-q07: The four squares around the centre fold up to become the cube's sides; the sixth square, attached beyond one of them, swings over the top to close the cube directly opposite the centre.

spatial-reasoning-s07-q08: Squares attached to opposite sides of the same centre square fold up into opposite walls of the cube, so E pairs with W (and N with S).

spatial-reasoning-s07-q09: In a 2x2x2 block every small cube sits at a corner, exposing exactly three mutually adjacent faces while the other three are glued inside.

spatial-reasoning-s07-q10: The corner diagonally opposite any corner is formed by the three faces opposite the original trio: here the opposites of 1, 2, and 3, which are 6, 5, and 4.

spatial-reasoning-s08-q01: Two-face-painted cubes sit on the middle of each edge (not the corners). A cube has 12 edges, each contributing exactly one such piece.

spatial-reasoning-s08-q02: Three painted faces only occur at the corners of the large cube, and a cube has exactly 8 corners.

spatial-reasoning-s08-q03: Two-face cubes lie along the edges between the corners: each of the 12 edges holds 4 - 2 = 2 of them, giving 12 x 2 = 24.

spatial-reasoning-s08-q04: One-face cubes sit at the centre of each face of the large cube: one per face, and a cube has 6 faces.

spatial-reasoning-s08-q05: Add the layers from bottom to top: 3 + 2 + 1 = 6 cubes.

spatial-reasoning-s08-q06: From directly above only the topmost cube in each floor position is visible, and the staircase occupies just three floor positions in a row.

spatial-reasoning-s08-q07: Side-on you see one column per floor position, with heights 1, 2, and 3, a stepped silhouette of 1 + 2 + 3 = 6 squares.

spatial-reasoning-s08-q08: Every small cube in a 2x2x2 block is a corner cube, so all 8 of them show exactly three painted faces.

spatial-reasoning-s08-q09: With the base unpainted, the centre cube of the bottom layer joins the true centre cube as paint-free, the hidden centre column below the top layer.

spatial-reasoning-s08-q10: The base layer shows 12 side faces around its perimeter and 8 top faces (9 minus the one covered); the single top cube adds 4 sides and 1 top: 12 + 8 + 5 = 25.

spatial-reasoning-s09-q01: Looking straight down the cylinder's axis you see only its circular top. The plan view of an upright cylinder is a circle.

spatial-reasoning-s09-q02: From the side, the straight vertical walls and flat top and bottom of an upright cylinder project a rectangular outline.

spatial-reasoning-s09-q03: From the front, the sloping sides converge to the apex, projecting a triangular outline. The square shows only in the view from above.

spatial-reasoning-s09-q04: Cutting parallel to the base slices straight across the cone's circular cross-section, giving a smaller circle.

spatial-reasoning-s09-q05: The cut is as tall as the cube but as wide as a face diagonal, which is about 1.41 times the side length, so it is a rectangle, not a square.

spatial-reasoning-s09-q06: A sphere looks the same from every direction, so every flat cut produces a circle. Largest when the cut passes through the centre.

spatial-reasoning-s09-q07: A cone has a circular footprint seen from above and sloping sides that project a triangle from the front. A cylinder would give a rectangle, a sphere a circle.

spatial-reasoning-s09-q08: Only a cube presents a square face in all three principal directions; a pyramid's front view is a triangle and a cylinder's plan view is a circle.

spatial-reasoning-s09-q09: The three cut edges are all diagonals of identical square faces, so all three sides are equal. The section is an equilateral triangle.

spatial-reasoning-s09-q10: From above, the outer edge and the central hole both project as circles, giving a ring-shaped (annulus) outline.

spatial-reasoning-s10-q01: Each roll away lifts the near face to the top: the first roll brings the 2 up and swings the old bottom face (6, opposite the 1) round to face you; the second roll lifts that 6 to the top.

spatial-reasoning-s10-q02: Turning the sheet anticlockwise carries its right-hand edge up to the top, and the right edge of a north-up map is east.

spatial-reasoning-s10-q03: Unfold two adjacent faces flat and the route becomes a straight line across a 1 x 2 rectangle: $\sqrt{(1^2 + 2^2)} = \sqrt{5} \approx 2.24$ metres.

spatial-reasoning-s10-q04: A half-turn about the vertical axis sends the front face to the hidden back and the right face to the hidden left, while the top face stays on top and remains visible.

spatial-reasoning-s10-q05: A half-turn moves each hand to the position directly opposite: the minute hand at 12 appears at 6 (half past) and the hour hand at 3 appears at 9.

spatial-reasoning-s10-q06: Combine the moves: a left-right flip followed by a half-turn undoes the sideways reversal but leaves the up-down reversal, which equals a single top-to-bottom flip.

spatial-reasoning-s10-q07: The three legs go north, east, then south: the north and south legs cancel, leaving you 10 m east, and after two clockwise quarter turns you face south.

spatial-reasoning-s10-q08: Count each group: 8 corner cubes (3 faces), 12 edge cubes (2 faces), 6 face-centre cubes (1 face), 1 centre cube (none), the edge cubes form the largest group.

spatial-reasoning-s10-q09: Three quarter-turns clockwise total 270°, and turning 270° one way lands in exactly the same position as turning 90° the other way.

spatial-reasoning-s10-q10: Rolling east tips the cube over its eastern bottom edge, lifting the west face (4) to the top while the north and south faces stay put; rolling north then lifts the south face (5) to the top.
