

Map and route reasoning: navigation practice: open practice pack

100 untimed questions across 10 authored sections.

Detail	Value
Pack	cognitive-skills-map-route-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.

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.

Learner worksheet

One hundred untimed self-check questions on directions, grids, routes, timetables, and journey planning. Every question contains all the information you need. Work through the sections in order, as the difficulty builds.

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

Cardinal directions and simple turns

Start with the compass: work out which way you face after simple quarter and half turns.

1. map-route-reasoning-s01-q01

You are facing north. You turn 90° clockwise. Which direction are you now facing?

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

Your answer: _____

2. map-route-reasoning-s01-q02

You are facing east. You turn 180° (a half turn). Which direction are you now facing?

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

Your answer: _____

3. map-route-reasoning-s01-q03

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

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

Your answer: _____

4. map-route-reasoning-s01-q04

Early one morning you walk directly towards the rising sun, then turn left. Which direction are you now facing?

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

Your answer: _____

5. map-route-reasoning-s01-q05

On a standard map with no compass rose shown, which direction is conventionally at the top?

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

Your answer: _____

6. map-route-reasoning-s01-q06

You are facing west. You turn 270° clockwise. Which direction are you now facing?

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

Your answer: _____

7. map-route-reasoning-s01-q07

In a park, the library is directly north of the fountain and the café is directly south of the fountain. Which of the three is furthest north?

- A. The café
- B. The library
- C. The fountain
- D. They are all level

Your answer: _____

8. map-route-reasoning-s01-q08

You are facing north. You turn left twice, 90° each time. Which direction are you now facing?

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

Your answer: _____

9. map-route-reasoning-s01-q09

You are travelling due south along a road when you take a branch to your right. Which compass direction does the branch head?

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

Your answer: _____

10. map-route-reasoning-s01-q10

A village lies directly west of a bridge. Standing in the village, in which direction is the bridge?

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

Your answer: _____

Left, right, and relative direction

Work out directions relative to a walker, driver, or another person's point of view.

11. map-route-reasoning-s02-q01

You walk a route that includes one left turn. Later you walk the same route in reverse. What does that left turn become on the way back?

- A. A left turn
- B. A right turn
- C. Straight ahead
- D. A U-turn

Your answer: _____

12. map-route-reasoning-s02-q02

You stand face to face with a friend. A door is on your right. On which side of your friend is the door?

- A. Their right
- B. Behind them
- C. Their left
- D. Directly in front of them

Your answer: _____

13. map-route-reasoning-s02-q03

You face north, then turn right, turn right again, and finally turn left (each turn is 90°). Which direction are you now facing?

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

Your answer: _____

14. map-route-reasoning-s02-q04

A cyclist heads east, turns left, then left again, then right (each turn is 90°). Which direction is the cyclist now heading?

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

Your answer: _____

15. map-route-reasoning-s02-q05

You face south and hold a map rotated so that south is at the top, matching your view. Which real-world direction lies off the left-hand edge of the map?

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

Your answer: _____

16. map-route-reasoning-s02-q06

Walking into a building along a corridor, you pass a storeroom on your right. Walking back out along the same corridor, on which side is the storeroom?

- A. On your right
- B. On your left
- C. Straight ahead
- D. Behind the entrance

Your answer: _____

17. map-route-reasoning-s02-q07

Starting out facing west, you turn right 90° , left 90° , then right 90° . Which direction are you now facing?

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

Your answer: _____

18. map-route-reasoning-s02-q08

A driver travelling north takes three consecutive right turns of 90° each. Which direction is the driver now travelling?

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

Your answer: _____

19. map-route-reasoning-s02-q09

Two people walk towards each other along the same street: one heads north, the other heads south. A shop stands on the northbound walker's right. On which side is the shop for the southbound walker?

- A. Their right
- B. Their left
- C. Directly ahead
- D. Directly behind

Your answer: _____

20. map-route-reasoning-s02-q10

You and a friend stand back to back: you face north, your friend faces south. Each of you then turns 90° to your own right. How do your facing directions now compare?

- A. The same direction
- B. Directions at right angles
- C. It cannot be determined
- D. Opposite directions

Your answer: _____

Grid references and coordinates

Locate points and count moves on lettered and numbered grids.

21. map-route-reasoning-s03-q01

On a map grid, x-values increase towards the east and y-values increase towards the north. In which direction do you travel going from (2, 3) to (5, 3)?

- A. North

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

Your answer: _____

22. map-route-reasoning-s03-q02

On the same style of grid (x east, y north), how many grid units apart are the points (4, 1) and (4, 6)?

- A. 4
- B. 5
- C. 6
- D. 7

Your answer: _____

23. map-route-reasoning-s03-q03

A grid labels its columns A to E from west to east and its rows 1 to 5 from south to north. Which square is directly north of square C2?

- A. B2
- B. C3
- C. D2
- D. C1

Your answer: _____

24. map-route-reasoning-s03-q04

On a city grid you may only move along grid lines (no diagonals). What is the minimum number of blocks from (1, 1) to (4, 5)?

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

Your answer: _____

25. map-route-reasoning-s03-q05

On a grid where x increases east, which of these points lies furthest west: (-3, 2), (1, 5), (4, -2), or (0, 0)?

- A. (1, 5)
- B. (-3, 2)
- C. (4, -2)
- D. (0, 0)

Your answer: _____

26. map-route-reasoning-s03-q06

A footpath runs in a straight line from (2, 4) to (8, 4). At which point is the halfway marker?

- A. (4, 4)
- B. (6, 4)
- C. (5, 4)
- D. (5, 0)

Your answer: _____

27. map-route-reasoning-s03-q07

On a grid with columns A to E running west to east and rows 1 to 5 running south to north, you stand at B2 and the flag is at D4. In which compass direction is the flag?

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

Your answer: _____

28. map-route-reasoning-s03-q08

A drone starts at (0, 0), flies 6 units east, then 2 units north, then 2 units west. What are its final coordinates?

- A. (4, 2)
- B. (6, 2)
- C. (2, 4)
- D. (8, 2)

Your answer: _____

29. map-route-reasoning-s03-q09

On a map, each grid square represents 500 m on the ground. How far apart in real distance are the grid points (1, 1) and (1, 5)?

- A. 1.5 km
- B. 2.5 km
- C. 4 km
- D. 2 km

Your answer: _____

30. map-route-reasoning-s03-q10

On a lettered grid (columns A–E west to east, rows 1–5 south to north), which of these squares touches square C3 only at a corner, not along an edge?

- A. C4
- B. D3
- C. C2
- D. B2

Your answer: _____

Distance, displacement, and cancelling legs

Track where a journey actually ends up, not just how far it travels.

31. map-route-reasoning-s04-q01

You walk 5 km north, then 5 km south. Where are you relative to your starting point?

- A. 5 km north
- B. 5 km south
- C. At the starting point
- D. 10 km north

Your answer: _____

32. map-route-reasoning-s04-q02

A walker goes 6 km north, then 2 km south. Where do they finish relative to the start?

- A. 8 km north
- B. 4 km south
- C. 2 km north
- D. 4 km north

Your answer: _____

33. map-route-reasoning-s04-q03

You walk 3 km north, then 4 km east. What is the straight-line distance back to your starting point?

- A. 5 km
- B. 6 km
- C. 7 km
- D. 12 km

Your answer: _____

34. map-route-reasoning-s04-q04

A hiker walks 2 km west, then 5 km north, then 2 km east. Where do they finish relative to the start?

- A. 4 km north
- B. 5 km north
- C. 5 km north-east
- D. 9 km north

Your answer: _____

35. map-route-reasoning-s04-q05

A jogger runs one complete lap of a 400 m park circuit, finishing back at the gate where they started. How far is the jogger from their starting point?

- A. 400 m
- B. 200 m
- C. 0 m
- D. 100 m

Your answer: _____

36. map-route-reasoning-s04-q06

A delivery rider goes 8 km east, then 3 km west, then 2 km west. Where do they finish relative to the start?

- A. 3 km east
- B. 3 km west
- C. 13 km east
- D. 5 km east

Your answer: _____

37. map-route-reasoning-s04-q07

You travel 6 km south, then 6 km west. Which single compass direction best describes where you now are relative to your starting point?

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

Your answer: _____

38. map-route-reasoning-s04-q08

A courier drives 5 km north, then 12 km east. What is the straight-line distance from the starting point to the finishing point?

- A. 13 km
- B. 17 km
- C. 12 km
- D. 15 km

Your answer: _____

39. map-route-reasoning-s04-q09

A walker goes 7 km north, then 4 km south, then 3 km south. Where do they finish relative to the start?

- A. 3 km north of the start
- B. 3 km south of the start
- C. 14 km north of the start
- D. Back at the start

Your answer: _____

40. map-route-reasoning-s04-q10

You walk 1 km north, 2 km east, 3 km south, then 2 km west. Where are you relative to your starting point?

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

Your answer: _____

Verbal route descriptions and landmarks

Build a mental map from written directions and landmark clues.

41. map-route-reasoning-s05-q01

From the station, the museum is two streets to the north and the bakery is one street to the north. Which building is closer to the station?

- A. The museum
- B. They are equally close
- C. It cannot be determined
- D. The bakery

Your answer: _____

42. map-route-reasoning-s05-q02

The town hall is east of the fountain, and the market is east of the town hall. Where is the market relative to the fountain?

- A. West of it
- B. North of it
- C. East of it
- D. It cannot be determined

Your answer: _____

43. map-route-reasoning-s05-q03

The school sits between the park and the pool along one straight road, and the park is at the road's western end. Which of the three is furthest east?

- A. The park
- B. The school
- C. The pool
- D. They are side by side

Your answer: _____

44. map-route-reasoning-s05-q04

A bus passes the cinema before the stadium, and the stadium before the hospital. Which of the three stops does it reach second?

- A. The cinema
- B. The hospital
- C. The stadium
- D. It cannot be determined

Your answer: _____

45. map-route-reasoning-s05-q05

To reach Anna's house from the church, walk one block north, then one block east. Which route takes you from Anna's house back to the church?

- A. One block west, then one block south
- B. One block east, then one block north
- C. One block north, then one block east
- D. One block south, then one block east

Your answer: _____

46. map-route-reasoning-s05-q06

A signpost on a straight road reads: Ford 3 km and Elm 5 km, both in the same direction. How far is it from Ford to Elm along the road?

- A. 2 km
- B. 3 km
- C. 5 km
- D. 8 km

Your answer: _____

47. map-route-reasoning-s05-q07

A signpost on a straight road points to Ford, 3 km one way, and Elm, 5 km the opposite way. How far is it from Ford to Elm along the road?

- A. 2 km
- B. 15 km
- C. 5 km
- D. 8 km

Your answer: _____

48. map-route-reasoning-s05-q08

Driving out of town you pass, in order, a farm, a windmill, and a bridge. Driving back along the same road, which do you pass second?

- A. The farm
- B. The windmill
- C. The bridge
- D. It depends on your speed

Your answer: _____

49. map-route-reasoning-s05-q09

The café is north of the town square and the gallery is west of the square. Standing in the square facing the café, on which side of you is the gallery?

- A. Your left
- B. Your right
- C. Behind you

- D. Straight ahead

Your answer: _____

50. map-route-reasoning-s05-q10

The hotel is two blocks east of the station, and the theatre is one block north of the hotel. Walking only along blocks, how many blocks is the station from the theatre?

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

Your answer: _____

Timetables and departures

Read departure times, journey lengths, and waiting times from schedule facts.

51. map-route-reasoning-s06-q01

A bus leaves at 09:20 and the journey takes 25 minutes. At what time does it arrive?

- A. 09:40
- B. 09:45
- C. 09:50
- D. 09:55

Your answer: _____

52. map-route-reasoning-s06-q02

Trains run every 15 minutes starting at 07:00. You reach the platform at 07:20. How long do you wait for the next train?

- A. 5 minutes
- B. 15 minutes
- C. 10 minutes
- D. 20 minutes

Your answer: _____

53. map-route-reasoning-s06-q03

Bus A departs at 08:05 and arrives at 08:50. Bus B departs at 08:20 and arrives at 08:55. Which bus has the shorter journey time?

- A. Bus A
- B. Bus B
- C. They are equal
- D. It cannot be determined

Your answer: _____

54. map-route-reasoning-s06-q04

A tram leaves at 10:45 and the ride takes 30 minutes. At what time does it arrive?

- A. 11:05
- B. 11:10
- C. 11:15
- D. 11:25

Your answer: _____

55. map-route-reasoning-s06-q05

A museum closes at 17:00 and recommends allowing at least 45 minutes for a visit. What is the latest entry time that still allows the full 45 minutes?

- A. 16:00
- B. 16:30
- C. 16:45
- D. 16:15

Your answer: _____

56. map-route-reasoning-s06-q06

A train departs at 14:32 and arrives at 15:18. How long is the journey?

- A. 44 minutes
- B. 46 minutes
- C. 48 minutes
- D. 54 minutes

Your answer: _____

57. map-route-reasoning-s06-q07

Your train arrives at 12:10. Connecting buses leave on the hour and on the half hour. How long is your wait?

- A. 10 minutes
- B. 15 minutes
- C. 20 minutes
- D. 30 minutes

Your answer: _____

58. map-route-reasoning-s06-q08

A journey takes 40 minutes. Departures are at 08:05, 08:15, 08:25, and 08:35. Which is the latest departure that arrives by 09:00?

- A. 08:15
- B. 08:25
- C. 08:05
- D. 08:35

Your answer: _____

59. map-route-reasoning-s06-q09

An overnight coach departs at 23:40 and arrives at 06:10 the next morning. How long is the journey?

- A. 6 hours 30 minutes
- B. 5 hours 30 minutes
- C. 7 hours 30 minutes
- D. 6 hours 50 minutes

Your answer: _____

60. map-route-reasoning-s06-q10

Ferries leave every 40 minutes, with the first at 06:00. Which is the first departure after 08:30?

- A. 08:20
- B. 08:30
- C. 09:00
- D. 08:40

Your answer: _____

Route choice under constraints

Pick the workable route when closures, tolls, and vehicle limits rule others out.

61. map-route-reasoning-s07-q01

Route 1 to the harbour is 10 km on open roads. Route 2 is 8 km but crosses a bridge that is closed for repairs. Which route should you take, and why?

- A. Route 2, because it is shorter
- B. Route 1, because Route 2 is impassable
- C. Either, as they are equivalent
- D. Neither route reaches the harbour

Your answer: _____

62. map-route-reasoning-s07-q02

Route A is 12 km. Route B is 15 km. Route C is normally 11 km but roadworks force a detour adding 5 km. Which route is now the shortest?

- A. Route A
- B. Route B
- C. Route C
- D. They are all equal

Your answer: _____

63. map-route-reasoning-s07-q03

Route A is 20 km driven at 60 km/h. Route B is 15 km driven at 30 km/h. Which route gets you there sooner?

- A. Route A, because it takes less time
- B. Route B, because it is shorter
- C. They take the same time

- D. It cannot be determined

Your answer: _____

64. map-route-reasoning-s07-q04

Route X takes 30 minutes but includes a £2 toll. Route Y is free but takes 45 minutes. How much time does paying the toll save?

- A. 10 minutes
- B. 20 minutes
- C. 15 minutes
- D. 30 minutes

Your answer: _____

65. map-route-reasoning-s07-q05

The direct street from the cinema to the bank is 3 blocks, but it is one-way against you. The shortest permitted driving route is 5 blocks. How many extra blocks does the one-way rule cost you?

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

Your answer: _____

66. map-route-reasoning-s07-q06

A driver must visit three sites, P, Q, and R, one after another, and Q must be visited before R. How many different visiting orders are possible?

- A. 2
- B. 4
- C. 6
- D. 3

Your answer: _____

67. map-route-reasoning-s07-q07

A car has a range of 150 km on a full tank. Route A is 120 km. Route B is 90 km. Route C is 160 km with no fuel stations along the way. Which route is NOT possible without refuelling?

- A. Route A
- B. Route B
- C. Route C
- D. All three are possible

Your answer: _____

68. map-route-reasoning-s07-q08

Your commute is a 10-minute walk to the station, a 25-minute train ride, and a 5-minute walk at the other end. To arrive by 09:00, what is the latest time you can leave home?

- A. 08:15
- B. 08:25
- C. 08:30
- D. 08:20

Your answer: _____

69. map-route-reasoning-s07-q09

A lorry is 3.2 m tall and weighs 10 tonnes. Route A passes under a bridge with 3.0 m clearance. Route B has a 3.5 m bridge but is 20 km longer. Route C has a 7.5-tonne weight limit. Which route can the lorry use?

- A. Route A
- B. Route B
- C. Route C
- D. None of them

Your answer: _____

70. map-route-reasoning-s07-q10

You need to drive into town on a Monday. North Road is closed every Monday, South Road is closed at weekends, and East Lane is closed all this week for resurfacing. Which road can you use?

- A. North Road
- B. East Lane
- C. South Road
- D. No road is available

Your answer: _____

Bearings and intercardinal navigation

Convert between three-figure bearings and compass directions, including diagonal headings.

71. map-route-reasoning-s08-q01

Which compass direction lies exactly halfway between north and east?

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

Your answer: _____

72. map-route-reasoning-s08-q02

Bearings are measured clockwise from north, so north is 000°. Which direction does a bearing of 090° point?

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

Your answer: _____

73. map-route-reasoning-s08-q03

Which compass direction corresponds to a bearing of 225° ?

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

Your answer: _____

74. map-route-reasoning-s08-q04

You are facing north-east and turn 90° clockwise. Which direction are you now facing?

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

Your answer: _____

75. map-route-reasoning-s08-q05

A walker heads out on a bearing of 060° . What bearing takes them directly back the way they came?

- A. 120°
- B. 300°
- C. 240°
- D. 060°

Your answer: _____

76. map-route-reasoning-s08-q06

A hiker walks 2 km north-east, then 2 km south-west. Where do they finish relative to the start?

- A. North-east of the start
- B. South-west of the start
- C. North of the start
- D. Back at the start

Your answer: _____

77. map-route-reasoning-s08-q07

The bearing from camp A to camp B is 045° . What is the bearing from camp B back to camp A?

- A. 045°
- B. 135°
- C. 315°
- D. 225°

Your answer: _____

78. map-route-reasoning-s08-q08

A ship sails 6 km on a bearing of 180° , then 6 km on a bearing of 270° . Which direction is the ship from its starting point?

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

Your answer: _____

79. map-route-reasoning-s08-q09

Which compass direction corresponds to a bearing of 135° ?

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

Your answer: _____

80. map-route-reasoning-s08-q10

A hiker walks 4 km on a bearing of 090° , then 4 km on a bearing of 000° . What is the approximate bearing from the starting point straight to the hiker's final position?

- A. 045°
- B. 090°
- C. 315°
- D. 135°

Your answer: _____

Multi-leg journey planning

Combine legs, transfers, waits, and speeds into a single journey plan.

81. map-route-reasoning-s09-q01

A journey is a 40-minute train ride, a 10-minute wait to transfer, then a 25-minute bus ride. How long is the whole journey?

- A. 1 hour 5 minutes
- B. 55 minutes
- C. 1 hour 25 minutes
- D. 1 hour 15 minutes

Your answer: _____

82. map-route-reasoning-s09-q02

You set off at 09:10 on a journey that takes 1 hour 15 minutes in total. When do you arrive?

- A. 10:15
- B. 10:20

- C. 10:25
- D. 10:35

Your answer: _____

83. map-route-reasoning-s09-q03

A driver covers 60 km in the first hour and 40 km in the second hour. What is the average speed across the whole journey?

- A. 45 km/h
- B. 50 km/h
- C. 55 km/h
- D. 60 km/h

Your answer: _____

84. map-route-reasoning-s09-q04

A route is a 1.5 km walk followed by an 800 m walk. What is the total distance in kilometres?

- A. 2.3 km
- B. 2.13 km
- C. 2.8 km
- D. 3.2 km

Your answer: _____

85. map-route-reasoning-s09-q05

Your train arrives at the port at 11:05. Ferries depart at 11:00 and then every 45 minutes. How long do you wait for the next ferry?

- A. 40 minutes
- B. 45 minutes
- C. 5 minutes
- D. 55 minutes

Your answer: _____

86. map-route-reasoning-s09-q06

Along one straight road from your home at kilometre 0 are the library (km 2), the shop (km 5), and the pool (km 6). Visiting all three in a single out-and-back trip from home, what is the minimum total distance?

- A. 26 km
- B. 16 km
- C. 12 km
- D. 13 km

Your answer: _____

87. map-route-reasoning-s09-q07

A journey has three travel legs of 20 minutes each and two waits of 12 minutes each between them. How long is the journey in total?

- A. 1 hour 12 minutes
- B. 1 hour 24 minutes
- C. 1 hour 36 minutes
- D. 1 hour 4 minutes

Your answer: _____

88. map-route-reasoning-s09-q08

To reach an appointment by 18:00 you need a 35-minute bus ride followed by a 10-minute walk. What is the latest time you can board the bus?

- A. 17:05
- B. 17:10
- C. 17:20
- D. 17:15

Your answer: _____

89. map-route-reasoning-s09-q09

The train costs £8 and takes 50 minutes door to door. The coach costs £5 but takes 80 minutes plus a 10-minute walk. How much longer is the cheaper option?

- A. 30 minutes
- B. 35 minutes
- C. 40 minutes
- D. 45 minutes

Your answer: _____

90. map-route-reasoning-s09-q10

A cyclist rides 12 km east in 45 minutes, rests for 15 minutes, then rides 8 km further east in 30 minutes. What is the average speed for the whole trip, including the rest?

- A. 10 km/h
- B. 15 km/h
- C. 20 km/h
- D. About 13 km/h

Your answer: _____

Complex navigation problems

Bring every skill together: counting routes, layered constraints, and meeting-point puzzles.

91. map-route-reasoning-s10-q01

On a city grid you must travel exactly 3 blocks east and 2 blocks north, moving only east or north at each step. How many different shortest routes are there?

- A. 6
- B. 8
- C. 10
- D. 12

Your answer: _____

92. map-route-reasoning-s10-q02

Moving only east or north on a grid from (0, 0) to (2, 2), there are 6 shortest routes. If the intersection at (1, 1) is closed, how many shortest routes remain?

- A. 2
- B. 3
- C. 4
- D. 6

Your answer: _____

93. map-route-reasoning-s10-q03

You start facing south, turn 90° left, then 180° right, then 90° left. Which direction are you now facing?

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

Your answer: _____

94. map-route-reasoning-s10-q04

Five villages sit along one straight east–west road. M is west of N. P is east of N. Q is between M and N. R is east of P. Which village is in the middle of the five?

- A. Q
- B. N
- C. P
- D. M

Your answer: _____

95. map-route-reasoning-s10-q05

Trains leave Ashford for Byfield at 10:00, 10:40, and 11:20, and the journey takes 55 minutes. You must reach Byfield by 12:00. What is the latest train you can catch?

- A. The 10:00
- B. The 10:40
- C. The 11:20
- D. None arrives in time

Your answer: _____

96. map-route-reasoning-s10-q06

A ship sails 10 km on a bearing of 090° , then 10 km on a bearing of 180° . What is the bearing from the starting point straight to the ship's final position?

- A. 090°
- B. 315°

- C. 225°
- D. 135°

Your answer: _____

97. map-route-reasoning-s10-q07

Three crossings span a river: a bridge open 06:00 to 20:00, a ferry that departs on the half hour every hour, and a tunnel open at all times. At 21:15, which crossing can you use immediately?

- A. The bridge
- B. The ferry
- C. The tunnel
- D. None of them

Your answer: _____

98. map-route-reasoning-s10-q08

Your direct route is 3 blocks east along one street. The block between the second and third intersections is closed, so at the second intersection you must go 1 block north, 1 block east, then 1 block south to rejoin the street. How many blocks is the full journey?

- A. 4
- B. 5
- C. 6
- D. 7

Your answer: _____

99. map-route-reasoning-s10-q09

Ali starts at the west end of an 18 km trail walking east at 4 km/h. Beth starts at the east end at the same time walking west at 5 km/h. How far from the west end do they meet?

- A. 8 km
- B. 9 km
- C. 10 km
- D. 4.5 km

Your answer: _____

100. map-route-reasoning-s10-q10

Starting at 14:00, a courier must visit a bank (closes 14:30), a depot (opens 14:30), and a print shop (open all afternoon). Each visit takes 10 minutes, and travel between any two locations, or from the start, takes 10 minutes. Which site must the courier visit first?

- A. The depot
- B. The print shop
- C. Any order works
- D. The bank

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.

Map and route reasoning: navigation practice: open practice pack answer key

Item	Choice	Answer
map-route-reasoning-s01-q01	B	East
map-route-reasoning-s01-q02	D	West
map-route-reasoning-s01-q03	A	East
map-route-reasoning-s01-q04	A	North
map-route-reasoning-s01-q05	C	North
map-route-reasoning-s01-q06	C	South
map-route-reasoning-s01-q07	B	The library
map-route-reasoning-s01-q08	D	South
map-route-reasoning-s01-q09	B	West
map-route-reasoning-s01-q10	D	East
map-route-reasoning-s02-q01	B	A right turn
map-route-reasoning-s02-q02	C	Their left
map-route-reasoning-s02-q03	C	East
map-route-reasoning-s02-q04	A	North
map-route-reasoning-s02-q05	A	East
map-route-reasoning-s02-q06	B	On your left
map-route-reasoning-s02-q07	A	North
map-route-reasoning-s02-q08	D	West
map-route-reasoning-s02-q09	B	Their left
map-route-reasoning-s02-q10	D	Opposite directions
map-route-reasoning-s03-q01	C	East
map-route-reasoning-s03-q02	B	5
map-route-reasoning-s03-q03	B	C3
map-route-reasoning-s03-q04	A	7
map-route-reasoning-s03-q05	B	(-3, 2)
map-route-reasoning-s03-q06	C	(5, 4)
map-route-reasoning-s03-q07	C	North-east
map-route-reasoning-s03-q08	A	(4, 2)
map-route-reasoning-s03-q09	D	2 km

map-route-reasoning-s03-q10	D	B2
map-route-reasoning-s04-q01	C	At the starting point
map-route-reasoning-s04-q02	D	4 km north
map-route-reasoning-s04-q03	A	5 km
map-route-reasoning-s04-q04	B	5 km north
map-route-reasoning-s04-q05	C	0 m
map-route-reasoning-s04-q06	A	3 km east
map-route-reasoning-s04-q07	B	South-west
map-route-reasoning-s04-q08	A	13 km
map-route-reasoning-s04-q09	D	Back at the start
map-route-reasoning-s04-q10	B	2 km south
map-route-reasoning-s05-q01	D	The bakery
map-route-reasoning-s05-q02	C	East of it
map-route-reasoning-s05-q03	C	The pool
map-route-reasoning-s05-q04	C	The stadium
map-route-reasoning-s05-q05	A	One block west, then one block south
map-route-reasoning-s05-q06	A	2 km
map-route-reasoning-s05-q07	D	8 km
map-route-reasoning-s05-q08	B	The windmill
map-route-reasoning-s05-q09	A	Your left
map-route-reasoning-s05-q10	B	3
map-route-reasoning-s06-q01	B	09:45
map-route-reasoning-s06-q02	C	10 minutes
map-route-reasoning-s06-q03	B	Bus B
map-route-reasoning-s06-q04	C	11:15
map-route-reasoning-s06-q05	D	16:15
map-route-reasoning-s06-q06	B	46 minutes
map-route-reasoning-s06-q07	C	20 minutes
map-route-reasoning-s06-q08	A	08:15
map-route-reasoning-s06-q09	A	6 hours 30 minutes
map-route-reasoning-s06-q10	D	08:40
map-route-reasoning-s07-q01	B	Route 1, because Route 2 is impassable
map-route-reasoning-s07-q02	A	Route A
map-route-reasoning-s07-q03	A	Route A, because it takes less time
map-route-reasoning-s07-q04	C	15 minutes
map-route-reasoning-s07-q05	B	2
map-route-reasoning-s07-q06	D	3
map-route-reasoning-s07-q07	C	Route C
map-route-reasoning-s07-q08	D	08:20
map-route-reasoning-s07-q09	B	Route B

map-route-reasoning-s07-q10	C	South Road
map-route-reasoning-s08-q01	C	North-east
map-route-reasoning-s08-q02	B	East
map-route-reasoning-s08-q03	A	South-west
map-route-reasoning-s08-q04	A	South-east
map-route-reasoning-s08-q05	C	240°
map-route-reasoning-s08-q06	D	Back at the start
map-route-reasoning-s08-q07	D	225°
map-route-reasoning-s08-q08	B	South-west
map-route-reasoning-s08-q09	B	South-east
map-route-reasoning-s08-q10	A	045°
map-route-reasoning-s09-q01	D	1 hour 15 minutes
map-route-reasoning-s09-q02	C	10:25
map-route-reasoning-s09-q03	B	50 km/h
map-route-reasoning-s09-q04	A	2.3 km
map-route-reasoning-s09-q05	A	40 minutes
map-route-reasoning-s09-q06	C	12 km
map-route-reasoning-s09-q07	B	1 hour 24 minutes
map-route-reasoning-s09-q08	D	17:15
map-route-reasoning-s09-q09	C	40 minutes
map-route-reasoning-s09-q10	D	About 13 km/h
map-route-reasoning-s10-q01	C	10
map-route-reasoning-s10-q02	A	2
map-route-reasoning-s10-q03	C	South
map-route-reasoning-s10-q04	B	N
map-route-reasoning-s10-q05	B	The 10:40
map-route-reasoning-s10-q06	D	135°
map-route-reasoning-s10-q07	C	The tunnel
map-route-reasoning-s10-q08	B	5
map-route-reasoning-s10-q09	A	8 km
map-route-reasoning-s10-q10	D	The bank

Worked explanations

map-route-reasoning-s01-q01: Clockwise follows the compass in the order north -> east -> south -> west, so one quarter turn from north points you east.

map-route-reasoning-s01-q02: A 180° turn always points you in the exact opposite direction, and the opposite of east is west.

map-route-reasoning-s01-q03: Anticlockwise runs against the compass order: south -> east -> north -> west. One quarter turn anticlockwise from south is east.

map-route-reasoning-s01-q04: The sun rises in the east, so you begin facing east; when you face east, a left

turn points you north.

map-route-reasoning-s01-q05: Unless a map states otherwise, the convention is north at the top, which also puts east on the right and west on the left.

map-route-reasoning-s01-q06: Track each quarter turn: west $\rightarrow$ north (90°) $\rightarrow$ east (180°) $\rightarrow$ south (270°). Alternatively, 270° clockwise equals 90° anticlockwise.

map-route-reasoning-s01-q07: Place the three on a north–south line: café, then fountain, then library. The library sits at the northern end.

map-route-reasoning-s01-q08: Two 90° turns in the same direction make 180° , which always leaves you facing the opposite way, south instead of north.

map-route-reasoning-s01-q09: Right and left depend on which way you face: when travelling south, your right-hand side points west.

map-route-reasoning-s01-q10: Directions reverse when you swap viewpoints: if the village is west of the bridge, the bridge must be east of the village.

map-route-reasoning-s02-q01: Reversing a route swaps every turn: because you approach each corner from the opposite side, left turns become right turns and vice versa.

map-route-reasoning-s02-q02: Two people facing each other have mirrored sides: whatever is on your right is on the other person's left.

map-route-reasoning-s02-q03: Update your heading one turn at a time: north $\rightarrow$ east (right) $\rightarrow$ south (right) $\rightarrow$ east (left). Tracking step by step avoids losing count.

map-route-reasoning-s02-q04: Follow each turn: east $\rightarrow$ north (left) $\rightarrow$ west (left) $\rightarrow$ north (right). A quick check is to net the turns: two lefts and a right equal one left overall.

map-route-reasoning-s02-q05: When a map is turned to match your facing direction, the map's left edge lines up with your own left side, and facing south, your left hand points east.

map-route-reasoning-s02-q06: Turning around to retrace your steps flips your left and right, so anything that was on your right on the way in is on your left on the way out.

map-route-reasoning-s02-q07: A right and a left cancel each other, leaving one net right turn: 90° clockwise from west is north.

map-route-reasoning-s02-q08: Three quarter turns clockwise total 270° , which is the same as one quarter turn anticlockwise: north $\rightarrow$ west.

map-route-reasoning-s02-q09: The northbound walker's right is the east side of the street. Facing south, east falls on your left, so the southbound walker sees the shop on their left.

map-route-reasoning-s02-q10: Work each person separately: your right turn takes north to east, while your friend's right turn takes south to west. East and west are opposites, so you still face away from each other.

map-route-reasoning-s03-q01: Compare the coordinates: only x changes, rising from 2 to 5. An increasing x-value on this grid means movement east.

map-route-reasoning-s03-q02: The x-values match, so the points sit on the same north–south line; subtract the y-values: $6 - 1 = 5$ units.

map-route-reasoning-s03-q03: Moving north keeps the column letter the same and increases the row number by one, taking C2 to C3.

map-route-reasoning-s03-q04: With no diagonal moves, add the east–west and north–south differences separately: $(4 - 1) + (5 - 1) = 3 + 4 = 7$ blocks.

map-route-reasoning-s03-q05: Furthest west means the smallest x-value; ignore the y-values entirely. The x-values are -3, 1, 4, and 0, and -3 is the smallest.

map-route-reasoning-s03-q06: Average each coordinate: $(2 + 8) \div 2 = 5$ for x, and y stays at 4, giving a

midpoint of (5, 4).

map-route-reasoning-s03-q07: Judge each axis separately: D is east of B, and row 4 is north of row 2. East plus north combines into north-east.

map-route-reasoning-s03-q08: Net each axis: east 6 then west 2 leaves $x = 4$, and the single northward leg leaves $y = 2$, so the drone ends at (4, 2).

map-route-reasoning-s03-q09: The points are 4 grid squares apart along the same line; multiply by the scale: $4 \times 500 \text{ m} = 2,000 \text{ m}$, which is 2 km.

map-route-reasoning-s03-q10: Corner-only (diagonal) neighbours differ by one step in both the column and the row. B2 shifts one column west and one row south of C3, while the others share a full edge.

map-route-reasoning-s04-q01: Equal legs in opposite directions cancel out completely: you walked 10 km in total but finished exactly where you began.

map-route-reasoning-s04-q02: Opposite directions subtract rather than add: 6 km north minus 2 km south leaves a net 4 km north of the start.

map-route-reasoning-s04-q03: The two legs form the sides of a right angle, so use Pythagoras: $\sqrt{3^2 + 4^2} = \sqrt{25} = 5 \text{ km}$, the classic 3-4-5 triangle.

map-route-reasoning-s04-q04: Handle each axis separately: the 2 km west and 2 km east cancel, leaving only the 5 km northward leg.

map-route-reasoning-s04-q05: Distance travelled and final displacement are different things: a full lap covers 400 m of ground but ends zero metres from the start.

map-route-reasoning-s04-q06: Total the eastward and westward movement separately: 8 km east against $3 + 2 = 5 \text{ km}$ west leaves a net 3 km east.

map-route-reasoning-s04-q07: Equal southward and westward legs place you diagonally from the start, exactly halfway between south and west: south-west.

map-route-reasoning-s04-q08: The legs meet at a right angle, so apply Pythagoras: $\sqrt{5^2 + 12^2} = \sqrt{169} = 13 \text{ km}$, the 5-12-13 triangle.

map-route-reasoning-s04-q09: Add the legs with direction in mind: 7 km north against $4 + 3 = 7 \text{ km}$ south nets to zero, so the walker is back where they began.

map-route-reasoning-s04-q10: Net each axis: east 2 and west 2 cancel, while north 1 against south 3 leaves 2 km south. Splitting a route into axes makes multi-leg journeys manageable.

map-route-reasoning-s05-q01: Both buildings lie in the same direction from the station, so compare the counts directly: one street away is closer than two.

map-route-reasoning-s05-q02: Chain the relationships: two eastward steps in a row keep everything on the same line, so the market must lie east of the fountain.

map-route-reasoning-s05-q03: Fix the known end first: park at the west, school in the middle, which forces the pool to the eastern end.

map-route-reasoning-s05-q04: Both clues share the stadium, which pins the order down as cinema, then stadium, then hospital, putting the stadium second.

map-route-reasoning-s05-q05: To reverse a route, undo the legs in reverse order with opposite directions: the final eastward block becomes westward first, then the northward block becomes southward.

map-route-reasoning-s05-q06: Both villages lie the same way from the signpost, so subtract the distances: $5 - 3 = 2 \text{ km}$ separates them.

map-route-reasoning-s05-q07: When destinations lie in opposite directions from the same point, add the distances: $3 + 5 = 8 \text{ km}$, passing the signpost on the way.

map-route-reasoning-s05-q08: Reversing a route reverses the order of landmarks, but the middle item of

three stays in the middle either way.

map-route-reasoning-s05-q09: Facing the café means facing north, and when you face north, west lies on your left-hand side.

map-route-reasoning-s05-q10: Chain the two clues into one route: two blocks east plus one block north makes three blocks of walking in total.

map-route-reasoning-s06-q01: Add the journey time to the departure: 09:20 plus 25 minutes is 09:45, with no hour boundary to cross.

map-route-reasoning-s06-q02: List the departures from the first one: 07:00, 07:15, 07:30. The first train after 07:20 leaves at 07:30, a 10-minute wait.

map-route-reasoning-s06-q03: Compare durations, not arrival times: Bus A takes 45 minutes while Bus B takes 35 minutes, so the later departure is actually the quicker ride.

map-route-reasoning-s06-q04: Cross the hour in two steps: 15 minutes takes you to 11:00, and the remaining 15 minutes lands on 11:15.

map-route-reasoning-s06-q05: Work backwards from the deadline: 17:00 minus 45 minutes is 16:15, the last moment a full-length visit still fits.

map-route-reasoning-s06-q06: Bridge the hour: 14:32 to 15:00 is 28 minutes, then 15:00 to 15:18 adds 18 more, giving 46 minutes in total.

map-route-reasoning-s06-q07: The buses run at :00 and :30 past each hour, so after a 12:10 arrival the next one leaves at 12:30. A 20-minute wait.

map-route-reasoning-s06-q08: Work backwards from the deadline: to arrive by 09:00 you must leave by 08:20, and the latest departure at or before that is 08:15, arriving 08:55.

map-route-reasoning-s06-q09: Split the journey at midnight: 23:40 to 00:00 is 20 minutes, and 00:00 to 06:10 is 6 hours 10 minutes, totalling 6 hours 30 minutes.

map-route-reasoning-s06-q10: Step through the timetable: 06:00, 06:40, 07:20, 08:00, 08:40. The first departure strictly after 08:30 is 08:40.

map-route-reasoning-s07-q01: A shorter distance is irrelevant if the route cannot be completed: the closed bridge removes Route 2 from consideration entirely.

map-route-reasoning-s07-q02: Recalculate before comparing: the detour makes Route C $11 + 5 = 16$ km, so Route A's 12 km is now the shortest of the three.

map-route-reasoning-s07-q03: Convert each route to time using $\text{time} = \text{distance} \div \text{speed}$: Route A takes 20 minutes while Route B takes 30, so the longer road is the faster journey.

map-route-reasoning-s07-q04: Subtract the two journey times: $45 - 30 = 15$ minutes saved, which is the trade-off you weigh against the £2 cost.

map-route-reasoning-s07-q05: Compare the permitted route with the direct one: $5 - 3 = 2$ additional blocks caused by the one-way restriction.

map-route-reasoning-s07-q06: Three sites give six orders in total, and the before-constraint holds in exactly half of them: P-Q-R, Q-P-R, and Q-R-P.

map-route-reasoning-s07-q07: Check each distance against the 150 km range: only Route C, at 160 km with nowhere to refuel, exceeds what the tank can cover.

map-route-reasoning-s07-q08: Total the legs first, $10 + 25 + 5 = 40$ minutes, then subtract from the deadline: 09:00 minus 40 minutes is 08:20.

map-route-reasoning-s07-q09: Test each constraint against the vehicle: the lorry is too tall for Route A and too heavy for Route C, so the longer Route B is the only lawful option.

map-route-reasoning-s07-q10: Apply each closure rule to the day in question: Monday rules out North Road,

the resurfacing rules out East Lane, but South Road only closes at weekends, so it is open.

map-route-reasoning-s08-q01: The intercardinal directions combine the names of their neighbours: halfway between north and east is north-east.

map-route-reasoning-s08-q02: Rotate 90° clockwise from north and you face east; each cardinal direction sits 90° further round (south 180° , west 270°).

map-route-reasoning-s08-q03: South is 180° and west is 270° ; a bearing of 225° falls exactly halfway between them, which is south-west.

map-route-reasoning-s08-q04: Quarter turns work on diagonal headings too: 90° clockwise from north-east (045°) is 135° , which is south-east.

map-route-reasoning-s08-q05: A return bearing is the outward bearing plus or minus 180° : $060^\circ + 180^\circ = 240^\circ$ points exactly the opposite way.

map-route-reasoning-s08-q06: North-east and south-west are exact opposites, so equal distances along them cancel completely, just as north and south would.

map-route-reasoning-s08-q07: Reversing a bearing adds 180° (subtract instead if that would pass 360°): $045^\circ + 180^\circ = 225^\circ$.

map-route-reasoning-s08-q08: Translate the bearings first: 180° is south and 270° is west. Equal legs south then west leave the ship south-west of where it began.

map-route-reasoning-s08-q09: East is 090° and south is 180° , so 135° sits exactly halfway between them: south-east.

map-route-reasoning-s08-q10: The legs are 4 km east then 4 km north, so the finish lies equally east and north of the start: a diagonal of north-east, which is bearing 045° .

map-route-reasoning-s09-q01: Include the wait as part of the journey: $40 + 10 + 25 = 75$ minutes, which is 1 hour 15 minutes door to door.

map-route-reasoning-s09-q02: Add the hour first, then the minutes: 09:10 plus 1 hour is 10:10, plus 15 minutes gives 10:25.

map-route-reasoning-s09-q03: Average speed is total distance over total time: 100 km in 2 hours gives 50 km/h. Because both legs took equal time, the simple average happens to agree.

map-route-reasoning-s09-q04: Convert to the same unit before adding: 800 m is 0.8 km, and $1.5 + 0.8 = 2.3$ km.

map-route-reasoning-s09-q05: You miss the 11:00 sailing by five minutes, so the next departure is 45 minutes later at 11:45. A 40-minute wait from 11:05.

map-route-reasoning-s09-q06: Because all three stops lie on the way to the furthest one, travel out to the pool and back, calling at the others en route: 6 km out plus 6 km back is 12 km.

map-route-reasoning-s09-q07: Total each type separately, then combine: $3 \times 20 = 60$ minutes travelling and $2 \times 12 = 24$ minutes waiting makes 84 minutes, or 1 hour 24 minutes.

map-route-reasoning-s09-q08: Add the legs, $35 + 10 = 45$ minutes, then count back from the deadline: 18:00 minus 45 minutes is 17:15.

map-route-reasoning-s09-q09: Build the full time for each option before comparing: the coach totals $80 + 10 = 90$ minutes against the train's 50, a difference of 40 minutes.

map-route-reasoning-s09-q10: Average speed uses the full elapsed time, rest included: 20 km in 90 minutes (1.5 hours) gives $20 \div 1.5 = 13.3$ km/h.

map-route-reasoning-s10-q01: Every shortest route is an arrangement of the letters E, E, E, N, N; count the arrangements: $5! \div (3! \times 2!) = 10$.

map-route-reasoning-s10-q02: Count the routes through the closed point and subtract: 2 ways from (0, 0) to

(1, 1) times 2 ways onward makes 4 blocked routes, leaving $6 - 4 = 2$.

map-route-reasoning-s10-q03: Trace it step by step: south $\rightarrow$ east (left 90°) $\rightarrow$ west (right 180°) $\rightarrow$ south (left 90°). The left and right turns net to zero, returning you to your original heading.

map-route-reasoning-s10-q04: Build the line clue by clue: M, then Q (between M and N), then N, then P, then R. Reading west to east gives M-Q-N-P-R, with N third of five.

map-route-reasoning-s10-q05: Add the journey time to each departure: the 10:40 arrives at 11:35, within the deadline, but the 11:20 arrives at 12:15, which is too late.

map-route-reasoning-s10-q06: The legs run 10 km east then 10 km south, placing the ship equally east and south of the start: that diagonal is south-east, bearing 135° .

map-route-reasoning-s10-q07: Test each option against the time: the bridge shut at 20:00, the next ferry is not until 21:30, but the tunnel never closes, so it is the only immediate crossing.

map-route-reasoning-s10-q08: The detour replaces one closed block with three (north, east, south), so the journey becomes 2 direct blocks plus the 3-block detour: 5 in total.

map-route-reasoning-s10-q09: Together they close the 18 km gap at $4 + 5 = 9$ km/h, so they meet after 2 hours; in that time Ali has walked $4 \times 2 = 8$ km from the west end.

map-route-reasoning-s10-q10: Going straight to the bank means arriving at 14:10 and finishing by 14:20, before it closes. Visiting anywhere else first delays the bank arrival to 14:30 at the earliest, after closing, so the bank has to come first.

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