

Year 4: Routes, robots and treasure maps: answers

Year 4 - Coordinates and Translation - Lesson 10.7

Answers. Final answers to the worksheet questions. Full step-by-step solutions for every question are free at websink.site/ks2-sats/maths/year-4/ch10-position-direction/routes-robots-and-treasure-maps/

Exercise 10G Robots, routes and treasure maps Non-calculator

1 A robot follows each program. Where does it finish, and which way is it facing?

(a) Start at **(1, 1)**, facing north. Program: **F3 R F4**

Answer: (5, 4), facing east

(b) Start at **(2, 5)**, facing east. Program: **F3 R F4 L F1**

Answer: (6, 1), facing east

(c) Start at **(6, 6)**, facing south. Program: **F2 R F3 R F1**

Answer: (3, 5), facing north

2 A robot faces the way shown. It follows the turns. Which way is it facing at the end?

(a) Facing north: **R R L**

Answer: east

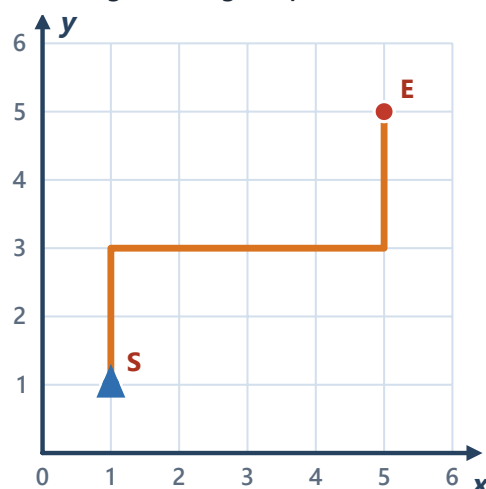
(b) Facing east: **L L L**

Answer: south

(c) Facing south: **R L R R**

Answer: north

3 The robot starts at **S (1, 1)** facing north and goes along the path to **E (5, 5)**.



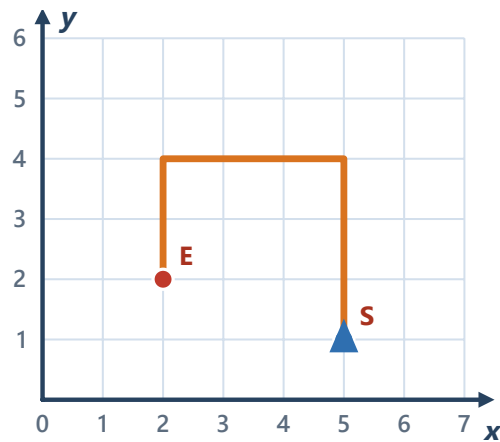
(a) Write a program for the path.

Answer: **F2 R F4 L F2**

(b) How many right angles does the robot turn through?

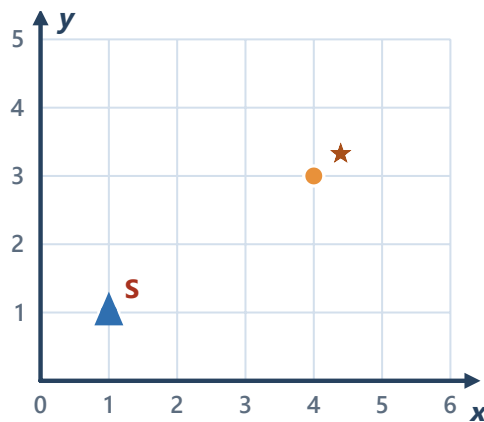
Answer: 2

- 4 The robot starts at S (5, 1) facing north. Write a program that takes it along the path to E (2, 2).



Answer: F3 L F3 L F2

- 5 The robot starts at S (1, 1) facing north. Which program takes it to the star at (4, 3)?
A: F3 R F2 B: F2 R F3 C: R F2 L F3



Answer: B

- 6 Read each treasure map. Where is the treasure?

- (a) Start at (1, 1). Go 4 east, then 3 north.

Answer: (5, 4)

- (b) Start at (7, 6). Go 5 west, then 4 south, then 2 east.

Answer: (4, 2)

- 7 The treasure is 3 right and 2 up from a rock at (3, 4). Where is the treasure?

Answer: (6, 6)

- 8 How many squares is the shortest route along the grid lines from the first point to the second?

- (a) (1, 2) to (5, 4)

Answer: 6

- (b) (0, 0) to (6, 3)

Answer: 9

- (c) (7, 5) to (2, 1)

Answer: 9

9 A robot starts at (1, 1) facing north. Its program is F2 R F3. Leo says it finishes at (3, 4). Is he right? Explain.

Answer: No. It finishes at (4, 3)

10 Write **always**, **sometimes** or **never** for each sentence.

(a) A robot turns right four times. It faces the way it started.

Answer: Always

(b) A robot facing north turns right a quarter turn. It now faces west.

Answer: Never

(c) When a robot follows F4, its y-coordinate changes.

Answer: Sometimes

11 A robot starts at (2, 2) facing north. It follows this program: F3 R F3 R F3 R F3. Where does it finish, and which way is it facing? What shape is the path it makes?

Answer: (2, 2), back at the start, facing west. A square

12 A robot starts at (2, 2) facing north. It must reach (6, 5). Write a program with only **3** instructions that does this.

Answer: F3 R F4