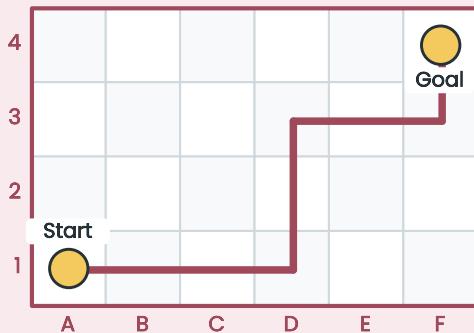


Follow It Exactly: Following Directions Practice for Grades 4–6

6 complete activities from Following Directions, each with a worked answer.



1 Face east. Forward 3

2 Turn left, forward 2

3 Turn right, forward 2

4 Turn left, forward 1

HOW TO USE

1. Read the situation and the evidence first.
2. Show your thinking in the work boxes, not only an answer.
3. Explain how you know your answer makes sense.
4. Try the new problem at the bottom of the page.

6 activities • 3 answer pages • From the 24-activity collection

10 US Letter pages • Print at 100% / Actual Size

Original Bobotemp educational printable • Fictional names, places and prices

Name _____ Date _____

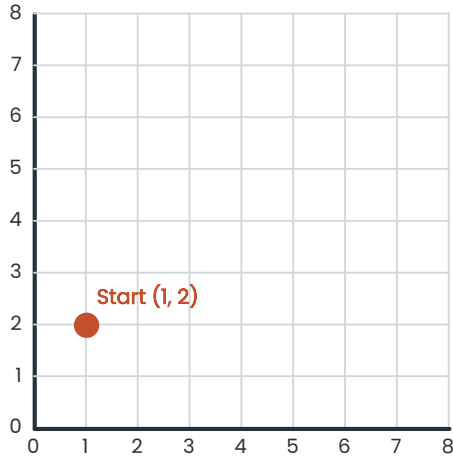
LEVEL 1



Use the 8-by-8 grid. The origin $(0, 0)$ is at the bottom left. Write each point as (x, y) : across first, then up.

A library helper robot starts at the return desk at $(1, 2)$. Follow the steps in order and log the robot's position after every step. Step 1: Move 4 units right. Step 2: Move 3 units up. Step 3: Move 2 units left. Step 4: Move 1 unit down. Where does the robot stop?

8-BY-8 GRID: (X, Y), ACROSS THEN UP



EVIDENCE TO USE

- Start: $(1, 2)$
- Right adds to x ; left subtracts from x
- Up adds to y ; down subtracts from y
- Log one point after each step

1. Write the point after each of the 4 steps.

2. Give the end point.

[illegible]

3. Check with net movement: find the total x change and total y change.

TRY IT • A new robot starts at $(6, 1)$. It moves 4 up, then 5 left, then 3 down. Where does it stop?

Name _____ Date _____

LEVEL 1



Use the heading log and the clockwise order N, E, S, W. Turns happen in place; only the facing direction changes.

Jordan stands at the park entrance facing west. Follow the turns in order and record the heading after each one. 1. Turn right 90 degrees. 2. Turn right 90 degrees. 3. Turn left 90 degrees. 4. Turn right 180 degrees. Which way is Jordan facing at the end?

HEADING LOG

Turn	Direction	Heading after
Start	—	west
1	Right 90°	
2	Right 90°	
3	Left 90°	
4	Right 180°	

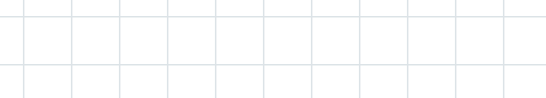
EVIDENCE TO USE

- Start heading: west
- Right = clockwise;
left = counterclockwise
- Quarter turn = 90° ; half
turn = 180°
- Clockwise order: N, E, S, W

1. Fill in the heading log after each turn.

[illegible]

2. Name the final heading.

A large rectangular area filled with a light gray grid, intended for drawing a picture. The grid consists of 10 columns and 10 rows of squares.

3. Check by finding the total turn: right turns count +, left turns count -.

TRY IT • Facing east, turn left, left, right, right, right (all 90 degrees). What is the final heading?

Name _____ Date _____

LEVEL 2 ●●○

Keep a log with two columns: position and heading. Update the log after every command.

A floor robot starts at (1, 1) facing north. 'Forward n' means move n units in the direction the robot is facing. Turns happen in place. Run the program: 1. Forward 3. 2. Turn right. 3. Forward 4. 4. Turn right. 5. Forward 2. 6. Turn left. 7. Forward 1. Where does the robot end, and which way is it facing?

ROBOT LOG

#	Command	Position	Heading
Start	—	(1, 1)	north
1	Forward 3		
2	Turn right		
3	Forward 4		
4	Turn right		
5	Forward 2		
6	Turn left		
7	Forward 1		

EVIDENCE TO USE

- Origin (0, 0) at bottom left; north is up
- Points are (x, y)
- Every turn is 90°
- Turns change heading, not position

1. Log the position and heading after each of the 7 commands.

2. Give the final position and heading.

[illegible]

3. Check x and y using net movement, and check the heading using the turns.

TRY IT • Start at (7, 7) facing south. Forward 3, turn right, forward 5, turn right, forward 2. Where does the robot end, and which way does it face?

Name _____ Date _____

LEVEL 2 ●●○

Log every result and number each subtraction. Check the stopping rule after every subtraction.

Start with 85. Repeat this step: subtract 9. After each subtraction, check the rule, and stop as soon as the result is less than 20. How many times did you subtract, and what number did you stop on? Finally, if the stopping number is odd, add the number of subtractions to it; otherwise, double it.

THE NUMBER CHAIN

1 Start with 85.

2 Subtract 9.

3 Is the result less than 20?
No: subtract 9 again. Yes:
stop.

4 Stopping number odd? Add the number of subtractions. Otherwise, double it.

EVIDENCE TO USE

- Start: 85
- Repeated step: subtract 9
- Stopping rule: result less than 20
- Check the rule after every subtraction

1. Log each result with its subtraction number.

[illegible]

2. Give the number of subtractions and the stopping number.

[illegible]

3. Apply the final if-otherwise rule and explain which branch you used.

TRY IT • Start with 100. Subtract 15 until the result is less than 30. How many subtractions do you make, and where do you stop?

Name _____ Date _____

LEVEL 3



Build your own correct log, then compare it with Sam's log line by line. Origin at bottom left; points are (x, y) .

Directions: Start at (2, 2). 1. Move 3 up. 2. Move 4 right. 3. Move 2 down. 4. Move 5 left. 5. Move 4 up. 6. Move 2 right. Sam logged these points: (2, 5), (6, 5), (6, 3), (2, 3), (2, 7), (4, 7). Find the first step Sam got wrong and explain the error. Then give the correct end point and confirm it with a net-movement check.

EVIDENCE TO USE

- Start: (2, 2)
- Sam's end point: (4, 7)
- Fix the first error, then continue from the corrected point
- Net check: add all x moves, add all y moves

1. Write the correct point after each step.

2. Name the first wrong step and explain what Sam did.

[illegible]

TRY IT • Start at $(5, 1)$: 3 left, 4 up, 1 right, 2 down. A log reads $(2, 1)$, $(2, 5)$, $(1, 5)$, $(1, 3)$. Find the first wrong step and the correct end point.

Name _____ Date _____

Ambiguity Hunt: Stage Positions

LEVEL 3 ●●●

Decide whose left and right the directions use. Then revise the directions so any reader gets the same result.

Five seats on a stage are numbered 1 to 5 from the audience’s left to the audience’s right. The director stands on stage facing the audience and writes: ‘Kai stands at the far left. Lia stands directly to the right of Kai. Ray stands two places to the right of Lia.’ The director meant left and right from the director’s own view. Which seat does Ray stand in? Then rewrite the directions so any reader gets the same result.

STAGE SEATS, FROM THE AUDIENCE’S LEFT TO RIGHT

Seat 1				Seat 5

EVIDENCE TO USE

- Seat numbers follow the audience’s view
- The director faces the audience
- Director’s left = audience’s right
- Goal: one result for every reader

1. Place Kai, Lia, and Ray using the director’s view.

2. Name Ray’s seat number.

3. Rewrite the three directions so they have only one meaning.

TRY IT • Ana and Ben sit facing each other across a table. Ana says, ‘The pencil is on my left.’ On which side is the pencil for Ben?

1. Library Grid Walk

LEVEL 1

The robot stops at (3, 4). The x-coordinate checks: $1 + 4 - 2 = 3$.

WORKED REASONING • Start (1, 2). Step 1: 4 right → (5, 2). Step 2: 3 up → (5, 5). Step 3: 2 left → (3, 5). Step 4: 1 down → (3, 4). Check: net x change is $+4 - 2 = +2$, so $x = 1 + 2 = 3$. Net y change is $+3 - 1 = +2$, so $y = 2 + 2 = 4$. The check matches (3, 4).

WATCH FOR • Some students write (y, x) or count the starting dot as the first unit moved. Coordinates are always across first, then up, and a move of 4 units means 4 jumps between grid lines.

TRANSFER • (1, 2): (6, 1) → (6, 5) → (1, 5) → (1, 2).

2. Park Compass Turns

LEVEL 1

South. The total turn is $90 + 90 - 90 + 180 = 270$ degrees clockwise.

WORKED REASONING • Start west. Turn 1 (right 90): west → north. Turn 2 (right 90): north → east. Turn 3 (left 90): east → north. Turn 4 (right 180): north → south. Check: $+90 + 90 - 90 + 180 = 270$ degrees clockwise. From west, 270 degrees clockwise passes north (90), east (180), and lands on south (270). Both methods give south.

WATCH FOR • A common error is treating 'right' as 'east' every time. Right and left are turns from the current heading, not compass directions; facing west, a right turn faces north.

TRANSFER • South: east → north → west → north → east → south (net 90 degrees clockwise).

9. Floor Robot with Headings

LEVEL 2

The robot ends at (6, 2) facing east. The x-coordinate checks: $1 + 4 + 1 = 6$.

WORKED REASONING • Start (1, 1), north. 1: forward 3 north → (1, 4). 2: right → east. 3: forward 4 east → (5, 4). 4: right → south. 5: forward 2 south → (5, 2). 6: left from south → east. 7: forward 1 east → (6, 2). Check: east moves total $4 + 1 = 5$, so $x = 1 + 5 = 6$; $y = 1 + 3 - 2 = 2$. Turn check: right, right, left is one net right turn from north → east.

WATCH FOR • Students may move one square right on paper for 'turn right,' or think a left turn from south faces west. A turn changes only the heading, and facing south, a left turn points east.

TRANSFER • (2, 6) facing north: forward 3 south → (7, 4); right turn → west; forward 5 → (2, 4); right turn → north; forward 2 → (2, 6).

10. Repeat-Until Number Chain

LEVEL 2

You subtract 9 eight times and stop on 13 ($85 - 8 \times 9 = 13$). Since 13 is odd, the final output is $13 + 8 = 21$.

WORKED REASONING • Log: $85 \rightarrow 76$ (1) → 67 (2) → 58 (3) → 49 (4) → 40 (5) → 31 (6) → 22 (7) → 13 (8). After subtraction 7 the result is 22, which is not less than 20, so keep going. After subtraction 8 the result is 13, which is less than 20, so stop. Check: $8 \times 9 = 72$ and $85 - 72 = 13$. Condition: 13 is odd, so add the count: $13 + 8 = 21$.

WATCH FOR • Students may stop at 22 because it is close to 20, or count the starting 85 as a step and report 9 subtractions. Count only subtractions, and stop the first time the rule is true.

TRANSFER • 5 subtractions, stopping at 25: 85, 70, 55, 40, 25.

17. Spot the First Wrong Step

LEVEL 3

Sam's first wrong step is Step 4 (he moved 4 left instead of 5). The correct end point is (3, 7); x checks as $2 + 4 - 5 + 2 = 3$.

WORKED REASONING • Correct log: Step 1 → (2, 5). Step 2 → (6, 5). Step 3 → (6, 3). Step 4: 5 left from $x = 6$ gives $x = 1$ → (1, 3). Sam wrote (2, 3), so Step 4 is the first error. Continue: Step 5 → (1, 7). Step 6 → (3, 7). Net check: x changes $+4 - 5 + 2 = +1$, so $x = 3$; y changes $+3 - 2 + 4 = +5$, so $y = 7$. Sam did Steps 5 and 6 correctly from a wrong point, so his error carried forward.

WATCH FOR • Students may mark every later point as a separate mistake. Steps 5 and 6 were followed correctly; the single error at Step 4 shifted every later point 1 unit right.

TRANSFER • Step 3 is wrong (moved left instead of right); it should be (3, 5). The correct end point is (3, 3).

18. Ambiguity Hunt: Stage Positions

LEVEL 3

Ray stands in Seat 2. In seat numbers, Kai is in Seat 5 and Lia is in Seat 4.

WORKED REASONING • The director faces the audience, so the director's left is the audience's right. 'Far left' for the director is Seat 5, so Kai is in Seat 5. Directly to the director's right of Seat 5 is Seat 4, so Lia is in Seat 4. Two places farther to the director's right is Seat 2, so Ray is in Seat 2. Revision: 'Kai stands in Seat 5. Lia stands in Seat 4. Ray stands in Seat 2.' Fixed seat labels remove the frame-of-reference problem.

WATCH FOR • Readers usually apply their own left and right and put Kai in Seat 1, Lia in Seat 2, and Ray in Seat 4. Left and right depend on which way the speaker faces, so directions must name the viewpoint or use fixed labels.

TRANSFER • On Ben's right, because Ana and Ben face opposite directions.