

MYSTERY PICTURE

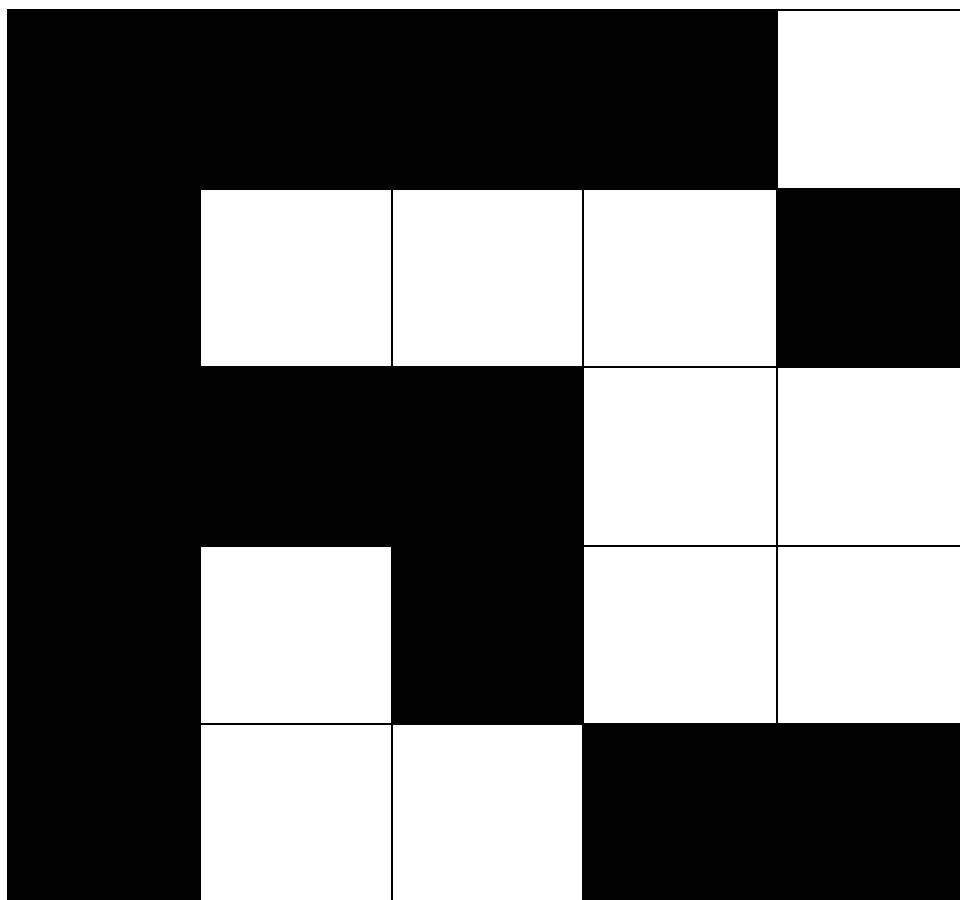


TRANSLATIONS IN THE COORDINATE PLANE

Translations: Is That the Rule's Arrow?

25 rules and 25 arrows · count squares, never add · wrong answers show in the picture

FREE



25 squares · 1 student sheet · answer key · 4 pages

Geometry · Grades 8–10 · chooseyourlesson.com

1. **Hand out page 3**, one per student. Pencils. Nothing else.
2. **Say this once:** *“The first number of the rule is how far across, the second is how far up. Is the arrow that many squares across and that many up? If yes, fill the square with slanted lines. If no, leave it white. Where the arrow is drawn does not matter.”*
3. **When you finish, look at the picture.** If part of it is missing, or one square does not fit, check that square again.

Student sheet	page 3, one per student. The rule and its arrow, with the run and the rise on its legs, are printed on it as pictures.
Answers	page 4 — the finished picture and the reason for every square.

Fourteen squares are filled and eleven are white. The finished picture is the letter R. Each white square shows a common mistake, drawn as an arrow. In two squares the arrow is reversed. In four one part of the arrow goes the wrong way. In two the run and the rise are swapped, so the first number is used for up and the second for across. In three one part is one square short. This happens when a student counts the starting square as the first step. No rule has a zero part or two equal parts. Either one would make some wrong arrows exactly the same as the right one.

The correct arrows are drawn all over the squared paper, not in one place. Some students believe the rule depends on where the figure is. A student who fills only the arrows that start in a corner gets a picture with holes in it.

Checking only half of the arrow is not enough. A student who checks only the run gets four squares wrong. A student who checks only the rise gets three wrong. **Guessing does not work either.** Every simple guessing rule, such as filling every arrow that points right, gets at least five squares wrong.



This is the free lesson this activity came from. The worksheet, the full answers and the lesson plan are on it, at three levels of difficulty.
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Mystery Picture

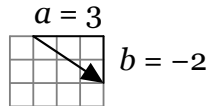
Is that the rule's arrow?

Name _____

Period _____

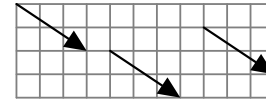
Date _____

Each square gives a rule and an arrow on squared paper. Does the arrow go the first number across and the second number up? If yes, fill the square with slanted lines. If no, leave it white. Count squares along the lines of the paper. Where the arrow is drawn does not matter. **When you finish, look at the picture. If part of it is missing, or one square does not fit, that square is wrong.**



$$(x, y) \rightarrow (x + 3, y - 2)$$

a is across: right +, left - · b is up: up +, down -



the same rule, drawn anywhere

every point of the plane moves by the same arrow

1 $(x, y) \rightarrow (x + 3, y - 2)$	2 $(x, y) \rightarrow (x - 4, y + 1)$	3 $(x, y) \rightarrow (x + 2, y + 3)$	4 $(x, y) \rightarrow (x - 1, y - 3)$	5 $(x, y) \rightarrow (x + 4, y + 1)$
6 $(x, y) \rightarrow (x - 2, y + 4)$	7 $(x, y) \rightarrow (x + 3, y - 4)$	8 $(x, y) \rightarrow (x - 2, y + 3)$	9 $(x, y) \rightarrow (x + 4, y + 2)$	10 $(x, y) \rightarrow (x + 1, y - 4)$
11 $(x, y) \rightarrow (x - 3, y - 2)$	12 $(x, y) \rightarrow (x + 4, y + 3)$	13 $(x, y) \rightarrow (x - 1, y + 2)$	14 $(x, y) \rightarrow (x - 3, y + 1)$	15 $(x, y) \rightarrow (x + 1, y - 3)$
16 $(x, y) \rightarrow (x + 2, y - 1)$	17 $(x, y) \rightarrow (x - 3, y - 2)$	18 $(x, y) \rightarrow (x - 4, y - 1)$	19 $(x, y) \rightarrow (x - 2, y - 3)$	20 $(x, y) \rightarrow (x + 3, y + 1)$
21 $(x, y) \rightarrow (x + 3, y + 4)$	22 $(x, y) \rightarrow (x - 1, y + 4)$	23 $(x, y) \rightarrow (x + 2, y - 1)$	24 $(x, y) \rightarrow (x - 3, y + 4)$	25 $(x, y) \rightarrow (x + 4, y - 3)$

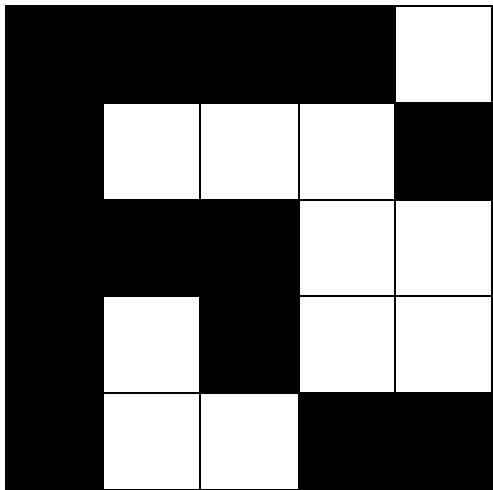


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Mystery Picture — answers

For the teacher

The finished sheet is **the letter R — the upright down the left, the bowl closed across the top three rows, and the leg kicking out to the bottom right**. The table reads left to right, as the sheet does.



1–5	FILL · the rule's arrow	FILL · the rule's arrow	FILL · the rule's arrow	FILL · the rule's arrow	white · run and rise swapped
6–10	FILL · the rule's arrow	white · up/down the wrong way	white · reversed	white · across one short	FILL · the rule's arrow
11–15	FILL · the rule's arrow	FILL · the rule's arrow	FILL · the rule's arrow	white · across the wrong way	white · up/down one short
16–20	FILL · the rule's arrow	white · run and rise swapped	FILL · the rule's arrow	white · up/down the wrong way	white · reversed
21–25	FILL · the rule's arrow	white · up/down one short	white · across the wrong way	FILL · the rule's arrow	FILL · the rule's arrow

How each white square is wrong. *Reversed:* the arrow goes the whole shift the other way. *Across the wrong way* or *up/down the wrong way:* one part goes the wrong way, and the other part is right. *Run and rise swapped:* the first number is drawn up and the second across. *One short:* one part is one square short. The student counted the square the arrow starts on as the first step.

A square is filled only when the arrow and the rule move every point the same way. Where the arrow is drawn does not matter.