

MYSTERY PICTURE

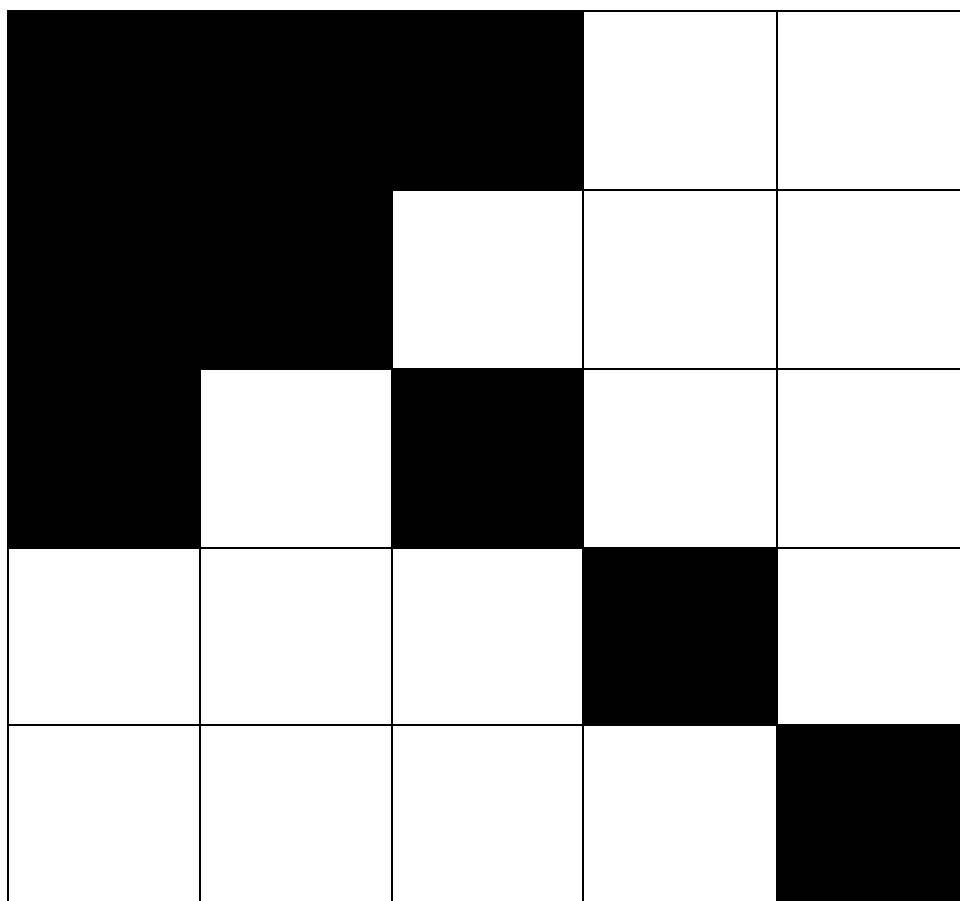


POINTS, LINES, PLANES AND DEFINITIONS

Lines, Rays, Segments, Angles, Circles: Is P
On It?

25 squares · no numbers · the picture checks the answers

FREE



1. **Hand out page 3.** That is the whole preparation.
2. **Say this once:** *“The drawing stops. The line, the ray and the angle do not. An arrowhead means it goes on. A dot means it stops there. A circle is only the curve.”*
3. **Fill a square with slanted lines if P is on the object. Leave it white if it is not.** A picture appears. 9 of the 25 are filled.

Student sheet	page 3, one per student. The five objects are printed on it as pictures.
Answers	page 4 — the finished picture and the reason for every square.

The drawing gives the wrong answer both ways, on purpose. On six filled squares, P is where nothing is drawn. It is past the arrowhead of a line or a ray, or past the end of an angle's shorter side. On seven white squares, P lines up exactly with a drawn line and is still not on the object. It is behind a ray's endpoint, past a segment's endpoint, or behind an angle's vertex. The main mistake in this lesson is to judge by where the drawing stops.

The angle is the hard one. Its sides are rays, so they go on past the drawn sides. Here the two sides are drawn at different lengths, so that this shows. A point *between* the sides is inside the angle, not on it. Three squares put P between the sides.

“Is the center on the circle?” Two squares ask this. Many students say yes, because they think of a circle as a filled disc.

Guessing does not work. Every simple guessing rule, such as filling every square that has an arrowhead, gets at least six squares wrong. The picture then has holes that a student can see from their own desk.



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

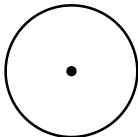
The definition decides, not the ink

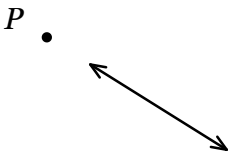
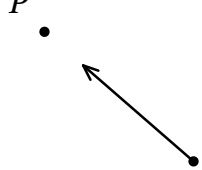
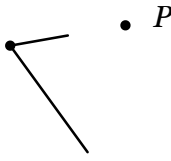
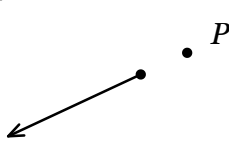
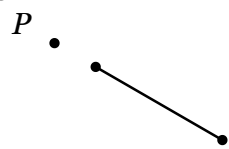
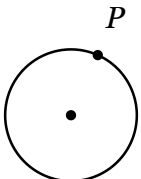
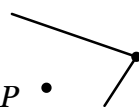
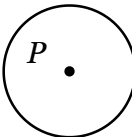
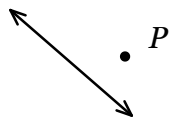
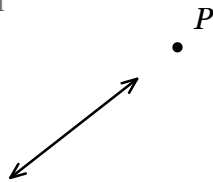
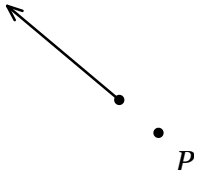
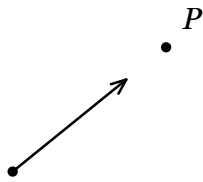
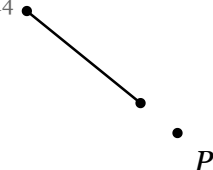
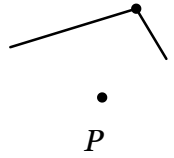
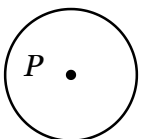
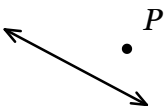
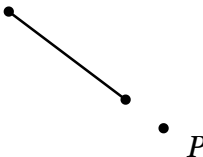
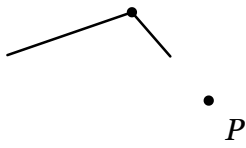
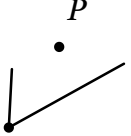
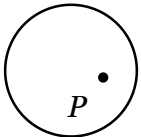
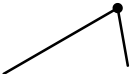
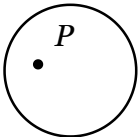
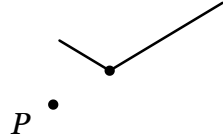
Name _____

Period _____

Date _____

Is P one of the points of the object in the square? If yes, fill it with slanted lines. If no, leave it white. The drawing stops. A line, a ray and an angle's sides do not. A picture appears. If it looks wrong, a square is wrong.

 Line <i>goes on forever both ways</i>	 Ray <i>starts at its dot, goes on one way</i>	 Segment <i>stops at both dots</i>	 Angle <i>two rays from one dot, and both go on</i>	 Circle <i>the curve only, not the center, not the inside</i>
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1 	2 	3 	4 	5 
6 	7 	8 	9 	10 
11 	12 	13 	14 	15 
16 	17 	18 	19 	20 
21 	22 	23 	24 	25 

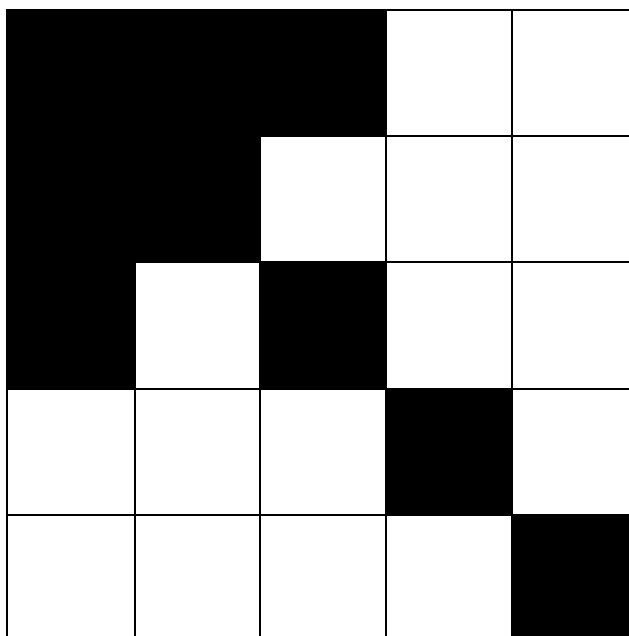


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Mystery Picture — answers

For the teacher

The finished sheet is **an arrow pointing into the top-left corner**. The head of the arrow is the block of squares in that corner. The shaft runs down to the bottom right. The table reads left to right, the way the sheet is read. The squares are numbered on the student's sheet.



1–5	FILL line: A line goes on past its arrowhead.	FILL ray: A ray goes on past its arrowhead.	FILL angle: A side is a ray, so it goes on.	white ray: A ray starts at its endpoint.	white segment: A segment stops at its endpoint.
6–10	FILL circle: P is on the curve.	FILL segment: P is between the two endpoints.	white angle: P is inside the angle, not on it.	white circle: The center is not on the circle.	white line: P is not on the line at all.
11–15	FILL line: A line goes on past its arrowhead.	white ray: A ray starts at its endpoint.	FILL ray: A ray goes on past its arrowhead.	white segment: A segment stops at its endpoint.	white angle: P is inside the angle, not on it.
16–20	white circle: The center is not on the circle.	white line: P is not on the line at all.	white segment: A segment stops at its endpoint.	FILL angle: A side is a ray, so it goes on.	white angle: P is inside the angle, not on it.
21–25	white circle: P is inside, not on the curve.	white angle: A side starts at the vertex.	white circle: P is inside, not on the curve.	white angle: A side starts at the vertex.	FILL angle: The vertex is on both sides.

Two common mistakes, and the squares they get wrong. A student who fills every square where P is on a drawn line leaves squares 1, 2, 3, 11, 13 and 19 white, which should be filled. A student who fills every square where P lines up with a drawn line fills squares 4, 5, 12, 14, 18, 22 and 24, which should stay white, and leaves square 6 white, which should be filled.

No square depends on sharp eyes. In every white square, P is at least a few millimeters from the object. P is either exactly on the object or clearly off it.