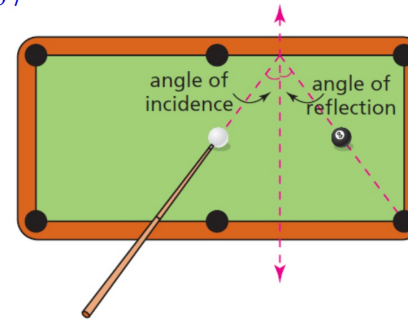


8.3 Reflecting to Find Shortest Paths

Objective:
Choose points that result in a minimum length for a path.

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VOCAB:

The **angle of incidence** is the angle between the incoming ball and the line perpendicular to the bumper at the collision point. The **angle of reflection** is the angle between the ball and the perpendicular line as the ball leaves the bumper.

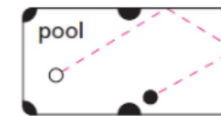
Example

Problem Your goal is to hit the white ball in the figure off the top bumper, the right bumper, and then knock the black ball into the bottom center pocket.



Find the point on the top bumper where the white ball should hit.

You should aim for the point where this line crosses the top edge of the table. Here is a sketch of the path the white ball will take.



On Your Own

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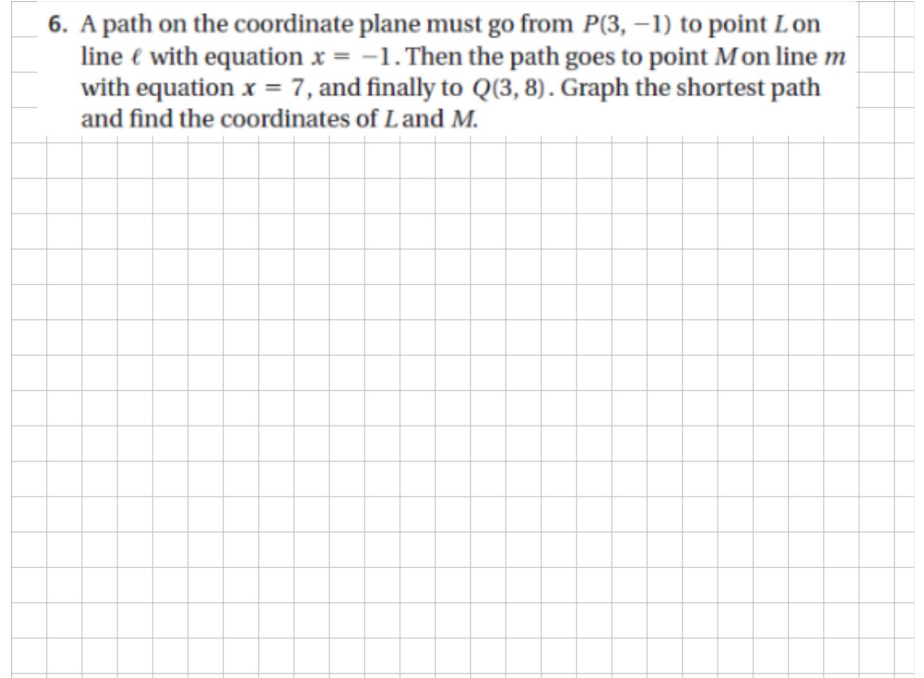
Check Your Understanding

1. Your goal is to hit the white ball off the top bumper, the bottom bumper, and then knock the black ball into the top left corner pocket.

Locate the point you should aim for and sketch the path you expect the ball to take.



6. A path on the coordinate plane must go from $P(3, -1)$ to point L on line ℓ with equation $x = -1$. Then the path goes to point M on line m with equation $x = 7$, and finally to $Q(3, 8)$. Graph the shortest path and find the coordinates of L and M .



10. **Standardized Test Prep** The measure of the angle at which a ray of light hits a mirror is 30° . What is the measure of the angle at which the ray of light reflects off the mirror?

A. 30° B. 60° C. 90° D. 150°

