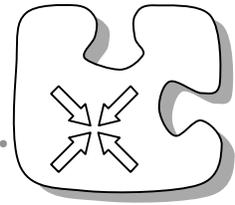# 6.2.1 How can I use it? What's the connection?

Angles on a Pool Table

The activities in this section review several big topics you have studied so far. Work with your team to decide which combination of **tools** you will need for each problem. As you work together, think about which skills and tools you are comfortable using and which ones you need more practice with.

As you work on this activity, keep in mind the following questions:

What mathematical concepts did you use to solve this problem?

What do you still want to know more about?

What connections did you find?

6-41.    TAKE IT TO THE BANK

Ricky just watched his favorite pool player, "Montana Mike," make a double bank shot in a trick-shot competition. Montana bounced a ball off two rails (sides) of the table and sank it in the corner pocket. "That doesn't look too hard," Ricky says, "I just need to know where to put the ball and which direction to hit it in."

A diagram of Montana's shot is shown at right. The playing area of a tournament pool table is 50 inches by 100 inches. Along its rails, a pool table is marked with a diamond every 12.5 inches. Montana started the shot with the ball against the top rail and the ball hit the bottom rail three diamonds from the right rail.
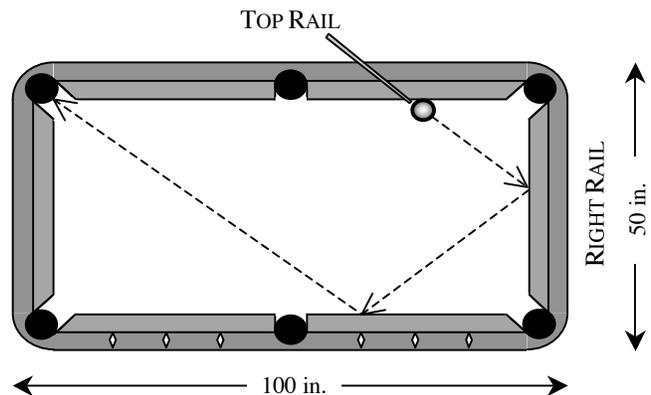
**Your task:** Figure out where on the top rail Ricky needs to place his ball and where he needs to aim to repeat Montana Mike's bank shot. Write instructions that tell Ricky how to use the diamonds on the table to place his ball correctly, and at what angle from the rail to hit the ball.

6-42.    EXTENSIONS

The algebraic and geometric **tools** you have developed so far will enable you to answer many questions about the path of a ball on a pool table. Work with your team to analyze the situations below.

a.    Ricky decided he wants to alter Montana's shot so that it hits the right rail exactly in at its midpoint. Where would Ricky need to place the ball along the top rail so that his shot reflects off the right rail, then the bottom rail, and enters the upper left pocket? At what angle with the top rail would he need to hit the ball?

b.    During another shot, Ricky noticed that Montana hit the ball as shown in the diagram at right. He estimated that the ball traveled 18 inches before it entered the pocket. Before the shot, the announcers noted that the distance of the ball to the top rail was 2 inches more than the distance along the top rail, as shown in the diagram. Where was the ball located before Montana hit it?
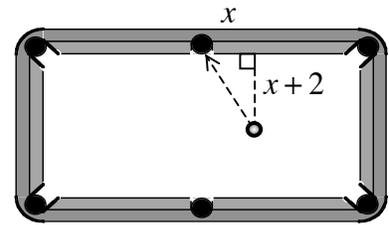


c.    Ricky wants to predict how Montana's next shot will end. The ball is placed at the second diamond from the left along the bottom rail, as shown at right. Montana is aiming to hit the ball toward the second diamond from the right along the top rail. Assuming he hits the ball very hard so that the ball continues traveling indefinitely, will the ball ever reach a pocket? If so, show the path of the ball. If not, explain how you know.
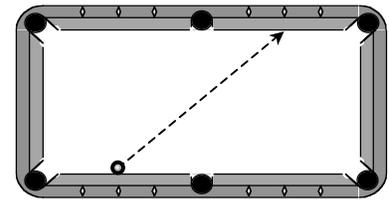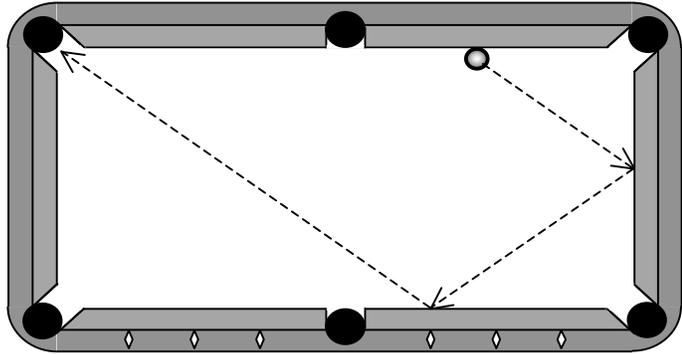


d.    After analyzing the path in part (c), Montana decided to start his ball from the third diamond from the left along the bottom rail, as shown at right. He is planning to aim at the same diamond as he did in part (c). If he hits the ball sufficiently hard, will the ball eventually reach a pocket? If so, show the path of the ball. If not, explain how you know.
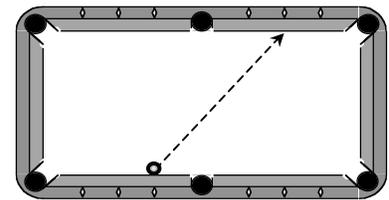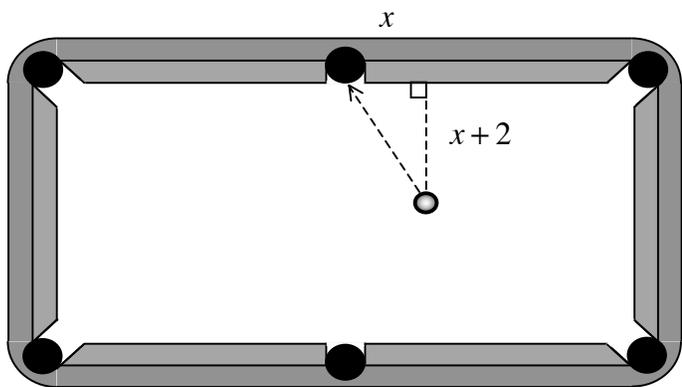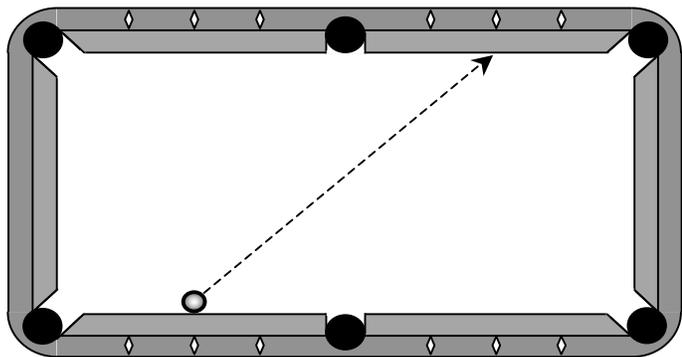
# Take It To The Bank

6-41.

6-42 part (a).

$x$

$x+2$

6-42 part (b).

6-42 part (c).