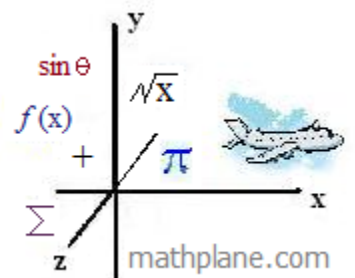


(Math) Trick Shots in the Pool Hall

3 arithmetic puzzles, coordinate geometry/reflection application, & 2 comics...



Math Billiards

33

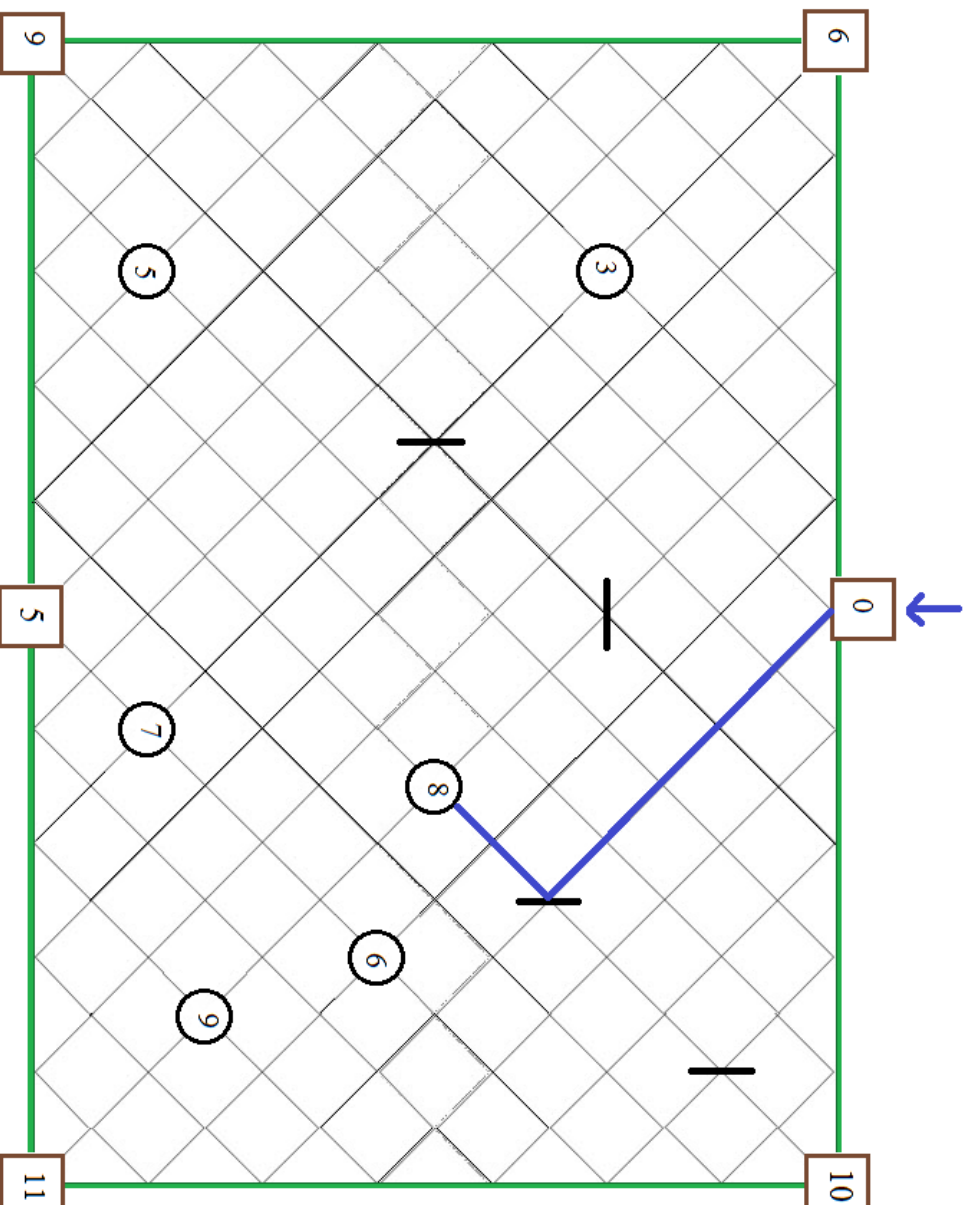
Goal: Get the required total score (33)

Rules:

- Start at the blue arrow.
(square side pocket '0')
- Follow the diagonal lines.
- When you hit a wall or bold line, change direction (as a pool ball caroms off a rail)
- When you enter a circle, add those points. Then, you may exit in any direction EXCEPT the way you entered.
- When you enter a square pocket, your game is over...

Strategy:

Try to land in a square pocket, giving you exactly 33 points.



Math Billiards

34

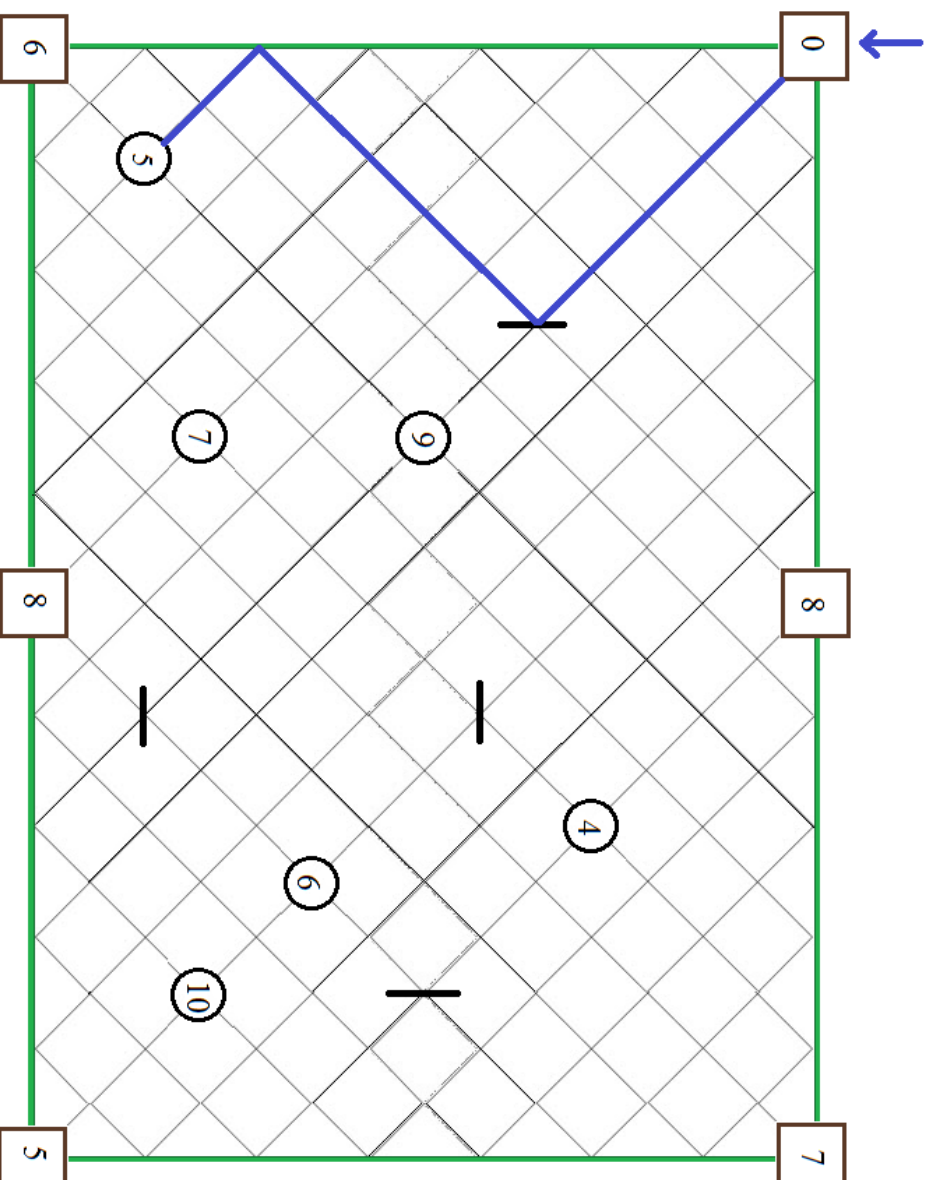
Goal: Get the required total score (34)

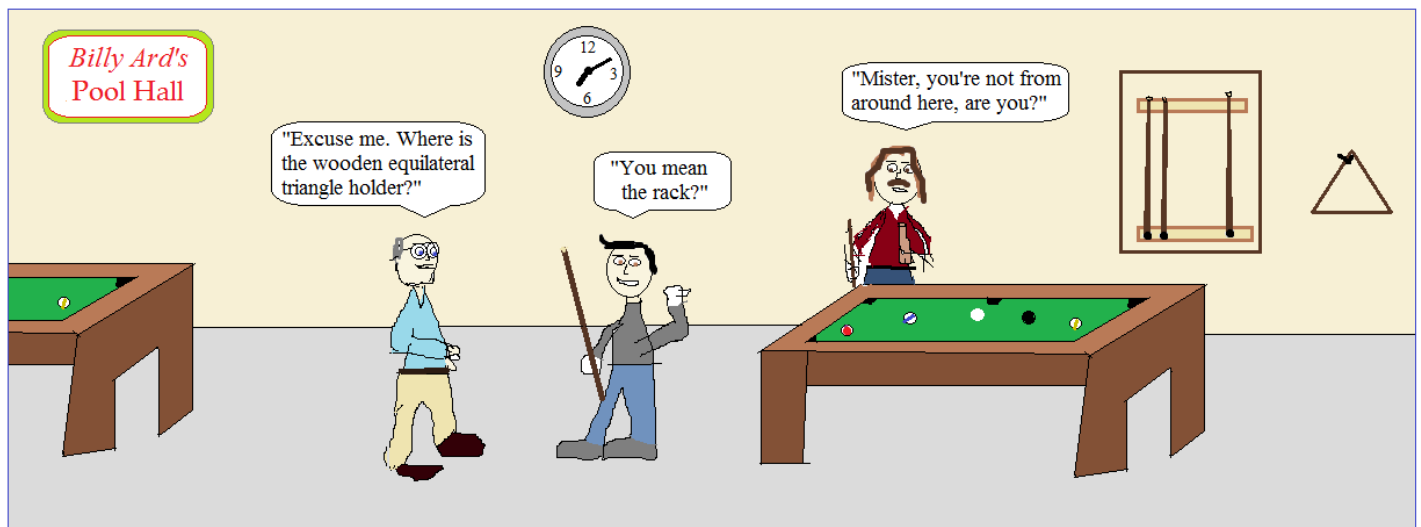
Rules:

- Start at the blue arrow.
(corner pocket '0')
- Follow the diagonal lines.
- When you hit a wall or bold line, change direction (as a pool ball caroms off a rail)
- When you enter a circle, add those points. Then, you may exit in any direction EXCEPT the way you entered.
- When you enter a square pocket, your game is over...

Strategy:

Try to land in a square pocket, giving you exactly 34 points.





The
(Math)
Hustler



LanceAF #52 9-29-12
www.mathplane.com



"Math Man, you shoot a great game of pool."

SOLUTIONS on next page →

puzzle 1:

Math Billiards

33

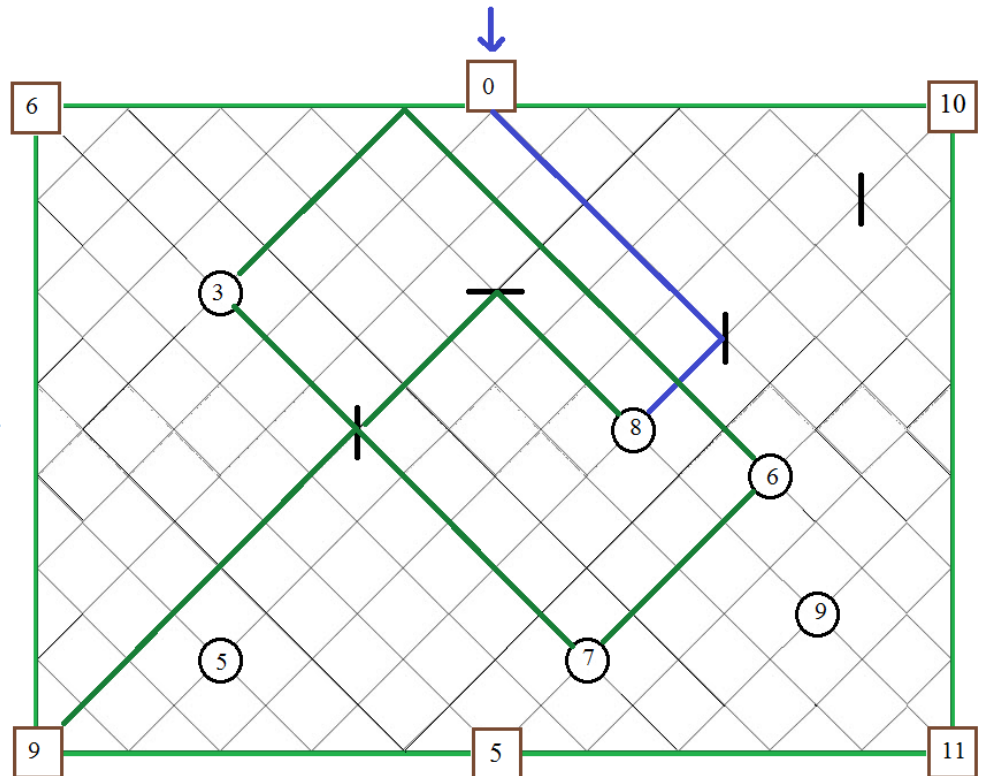
Goal: Get the required total score (33)

Rules:

- Start at the blue arrow.
(square side pocket '0')
- Follow the diagonal lines.
- When you hit a wall or bold line, change direction (as a pool ball caroms off a rail)
- When you enter a circle, add those points. Then, you may exit in any direction EXCEPT the way you entered.
- When you enter a square pocket, your game is over...

Strategy:

Try to land in a square pocket, giving you exactly 33 points.



puzzle 2:

Math Billiards

34

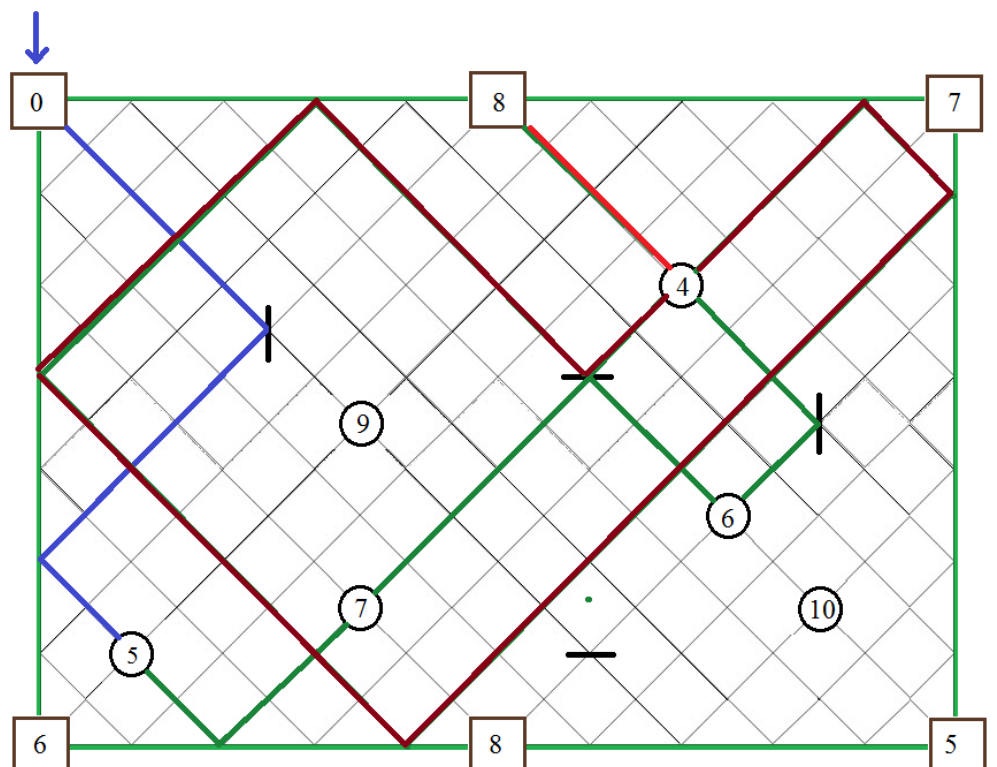
Goal: Get the required total score (34)

Rules:

- Start at the blue arrow.
(corner pocket '0')
- Follow the diagonal lines.
- When you hit a wall or bold line, change direction (as a pool ball caroms off a rail)
- When you enter a circle, add those points. Then, you may exit in any direction EXCEPT the way you entered.
- When you enter a square pocket, your game is over...

Strategy:

Try to land in a square pocket, giving you exactly 34 points.



puzzle 3:

Math Billiards

31

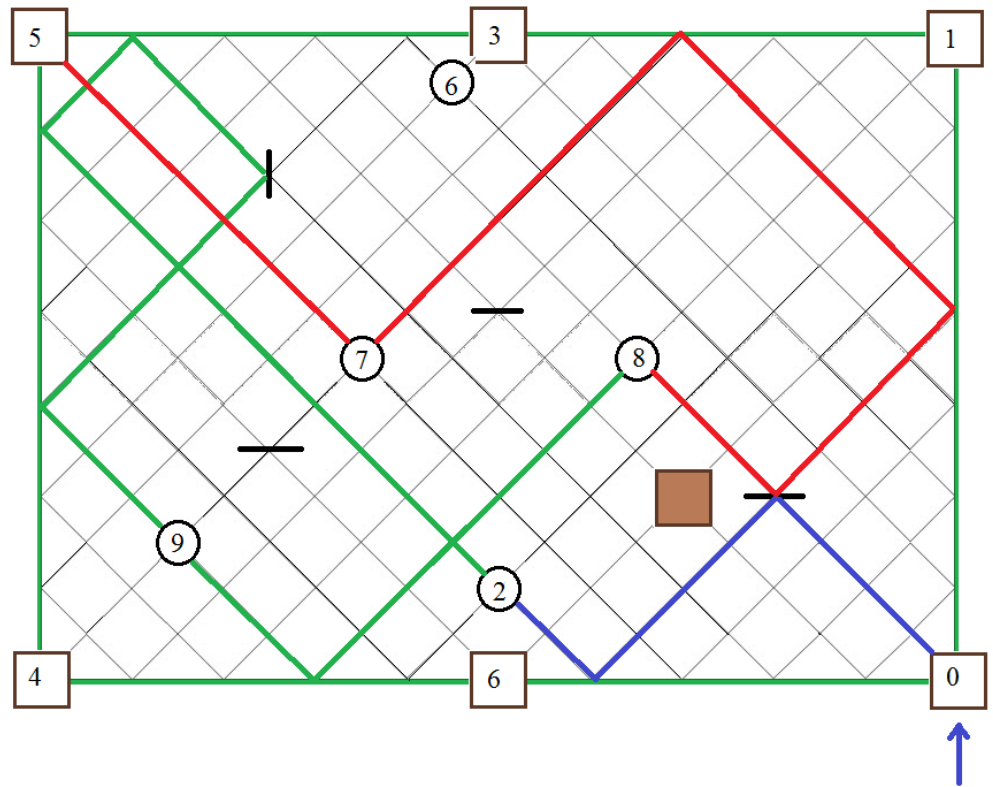
Goal: Get the required total score (31)

Rules:

- Start at the blue arrow.
(corner pocket '0')
- Follow the diagonal lines.
- When you hit a wall or bold line, change direction (as a pool ball caroms off a rail)
- When you enter a circle, add those points.
Then, you may exit in any direction EXCEPT the way you entered.
- When you enter a square pocket, your game is over...

Strategy:

Try to land in a square pocket, giving you exactly 31 points.

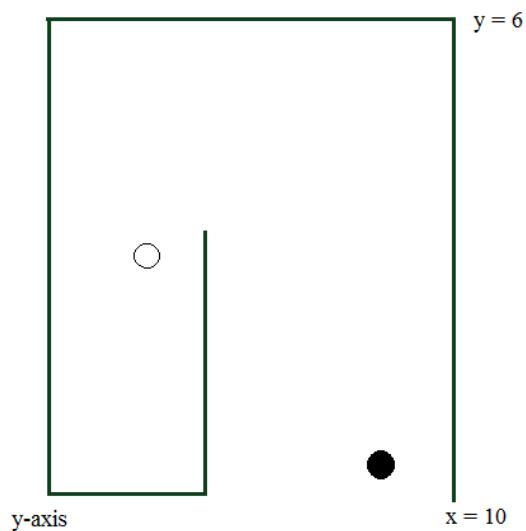


Coordinate Geometry and Reflection →

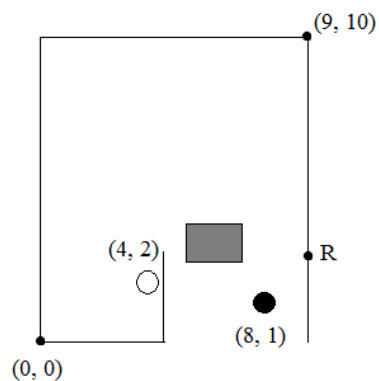
The diagram is a "pool table" and coordinate plane,
where the hole is at $(3, 2)$ and the ball is positioned at $(8, -2)$.

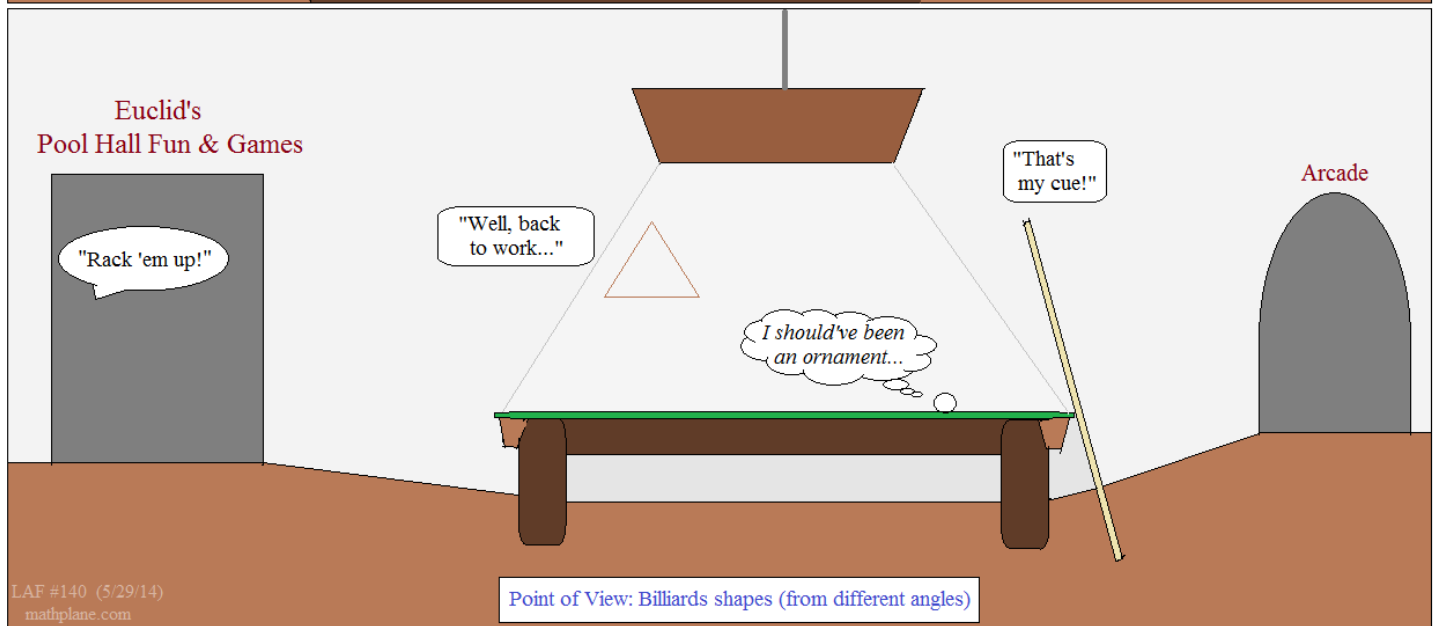
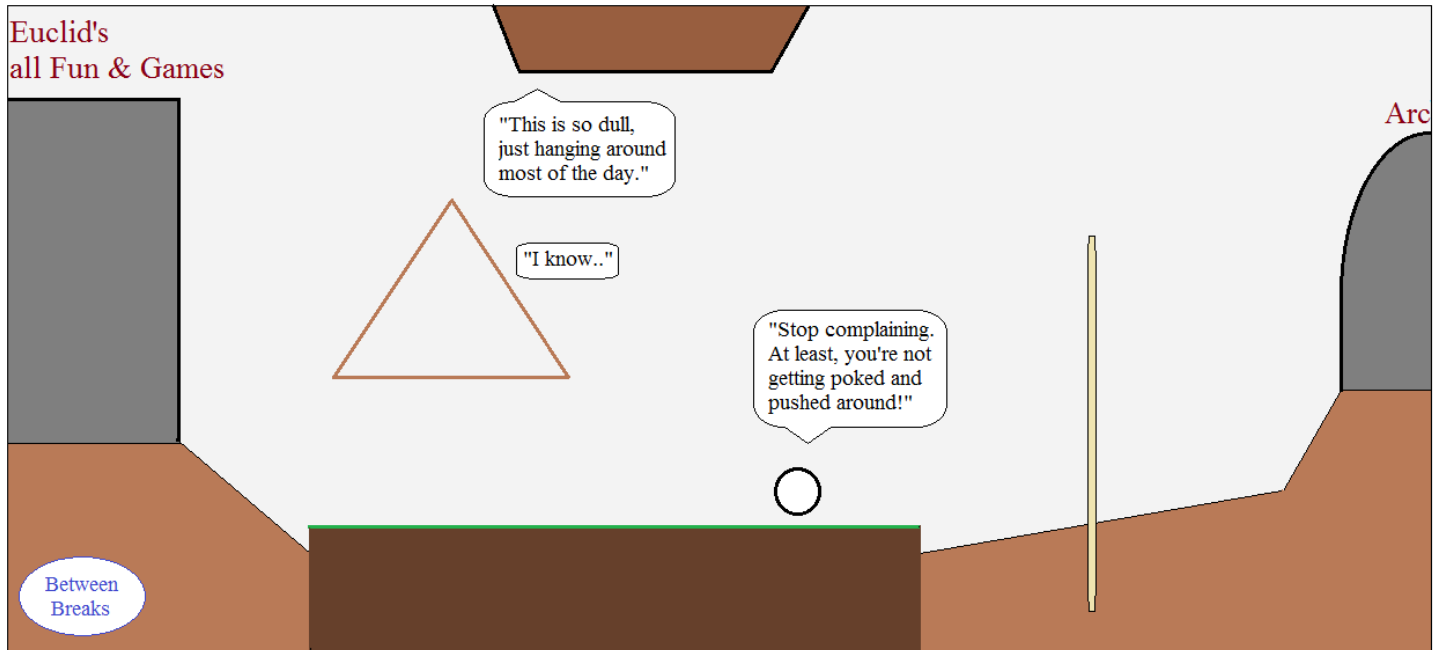
a) If you reflect the image of the hole over the (upper) cushion,
what is the coordinate?

b) What is the coordinate (on the cushion) a player must hit
in order to sink the bank shot?



The grid models a bumper pool board.
R is the spot needed to be hit in order to sink the shot.
What is the coordinate of R?





SOLUTIONS ->

The diagram is a "pool table" and coordinate plane,
where the hole is at $(3, 2)$ and the ball is positioned at $(8, -2)$.

- a) If you reflect the image of the hole over the (upper) cushion, what is the coordinate?

the hole $(3, 2)$ is 4 units from $y = 6$...
then, the image is 4 units on the other side....
so, the image is $(3, 10)$

- b) What is the coordinate (on the cushion) a player must hit in order to sink the bank shot?

We need to find where the line (from the image to the ball) intersects the cushion:

equation of line (from image to cushion):

$$\text{slope} = \frac{10 - (-2)}{3 - 8} = \frac{-12}{5}$$

point: $(3, 10)$

$$(y - 10) = \frac{-12}{5}(x - 3)$$

$$y = \frac{-12}{5}x + \frac{86}{5}$$

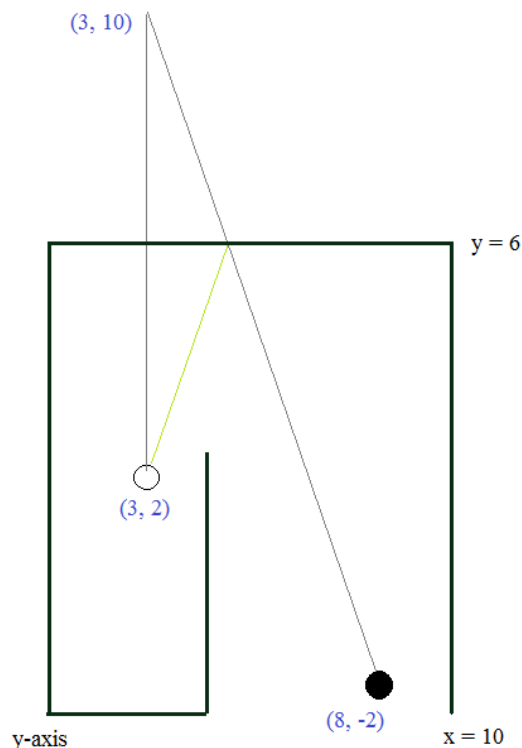
And, it intersects the cushion ($y = 6$)

$$\text{at } 6 = \frac{-12}{5}x + \frac{86}{5}$$

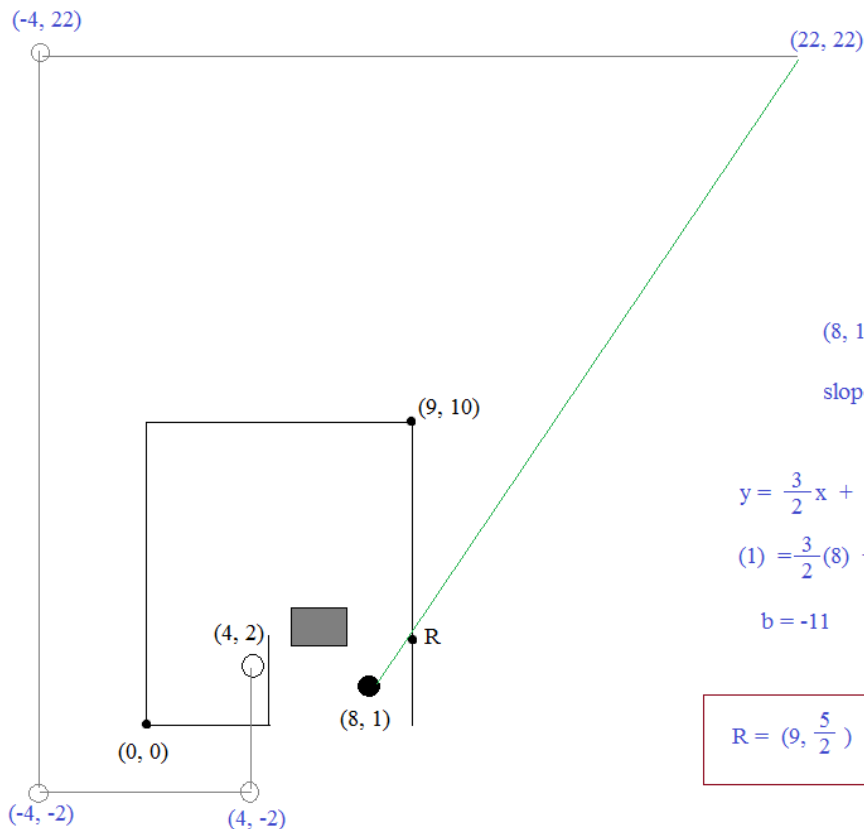
$$\frac{-56}{5} = \frac{-12}{5}x$$

$$x = \frac{56}{12} = 4\frac{2}{3}$$

$$\left(4\frac{2}{3}, 6\right)$$



The grid models a bumper pool board.
R is the spot needed to be hit in order to sink the shot.
What is the coordinate of R?



$(8, 1)$ and $(22, 22)$

$$\text{slope} = \frac{21}{14} = \frac{3}{2}$$

$$y = \frac{3}{2}x + b$$

$$(1) = \frac{3}{2}(8) + b$$

$$b = -11$$

$$R = \left(9, \frac{5}{2}\right)$$

$$y = \frac{3}{2}x - 11$$

then, find where it intersects the right cushion (i.e. $x = 9$)

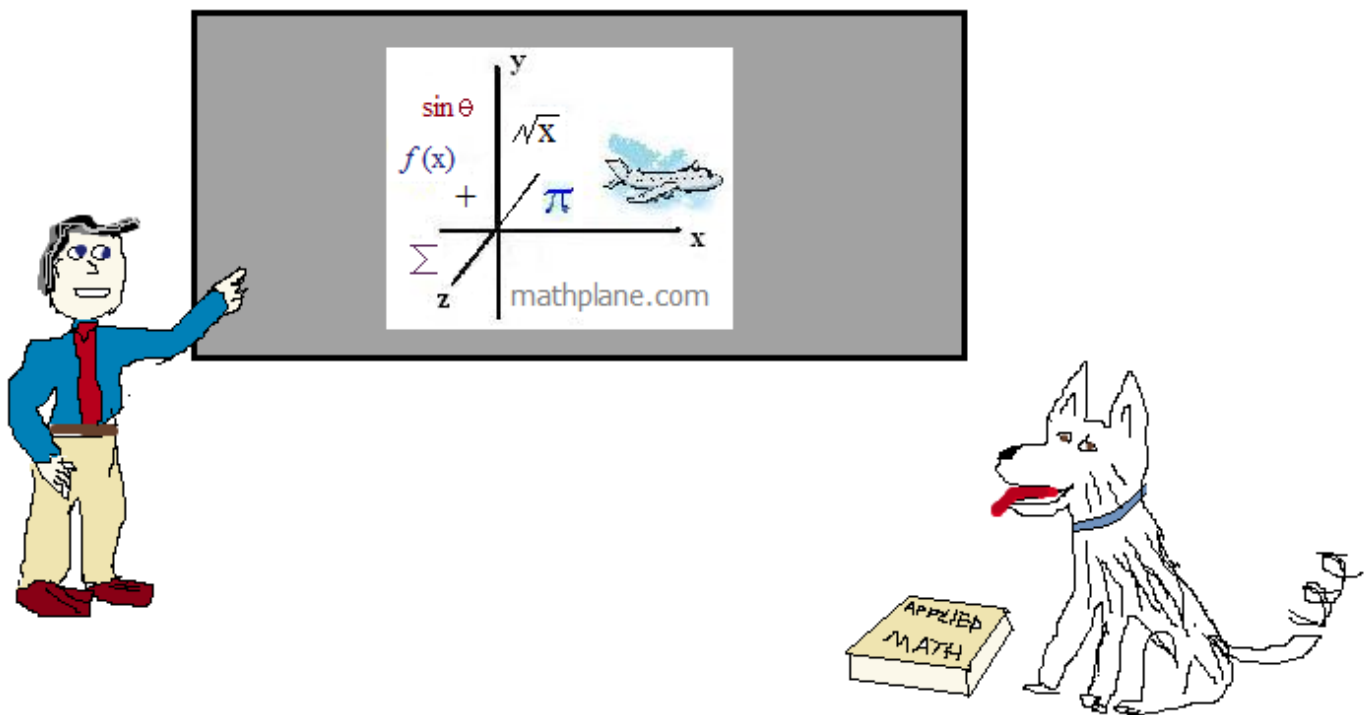
$$y = \frac{3}{2}(9) - 11$$

$$y = 5/2$$

Thanks for visiting!

If you have questions, suggestions, or requests, let us know.

Enjoy



Also, at Facebook, Google+, TeachersPayTeachers, and Pinterest