

## Writing Absolute Value Equations

Name: \_\_\_\_\_

Write the equation of the absolute value function that has the following vertex and point.

1) vertex:  $(0, 5)$ , passes through  $(-8, 9)$

2) vertex:  $(-3, -2)$ , passes through  $(5, -12)$

3) A rainstorm begins, builds up to a heavy rain, and then fades over the course of several hours. The rate of rainfall (in inches per hour) can be modeled by an absolute value function  $R(t)$ . The rain falls hardest after two hours at a rate of 1.5 inches per hour corresponding to the coordinate  $(2, 1.5)$ .

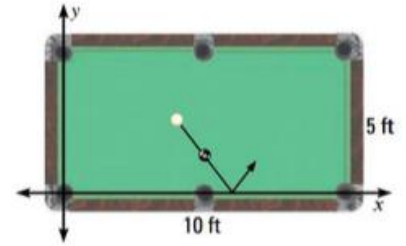
a. Write the equation for  $R(t)$ .

b. Sketch a graph of  $R(t)$ .

c. The total amount of rain that falls during the rainstorm can be determined by finding the area in the first quadrant in between the graph and the  $x$ -axis. How much rain fell during the storm?

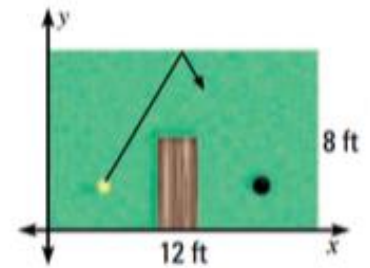
4) While playing pool, you try to shoot the eight ball into the corner pocket as shown. Imagine that a coordinate plane is placed over the pool table. The eight ball is at  $(5, \frac{5}{4})$  and the pocket you are aiming for is at  $(10, 5)$ . You are going to bank the ball off the side at  $(6, 0)$ .

a. Write an equation for the path of the eight ball. Verify the ball falls into the corner pocket by substituting  $x = 10$  into your equation.



5) You are trying to make a hole-in-one on the miniature golf green shown. Imagine that a coordinate plane is placed over the golf green. The golf ball is at  $(2.5, 2)$  and the hole is at  $(9, 2)$ . You are going to bank the ball off the side wall of the green at  $(6, 8)$ .

a. Write an equation for the path of the ball.



b. Will you make a hole-in-one?

6) At a science museum exhibit, a beam of light originates at a point 10 feet off the floor. It is reflected off a mirror on the floor that is 15 feet from the wall the light originates from. How high off the floor on the opposite does the light hit if the other wall is 8.5 feet from the mirror?