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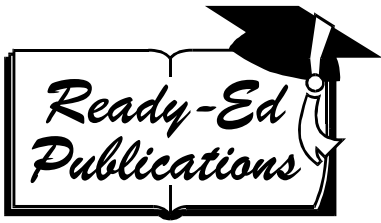
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# Active Math

**Problem solving math  
for 10 - 12 year old  
students.**

**(Uses both customary and metric  
measurements.)**

Written by Ken Smith. Illustrated by Rod Jefferson.

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**SAMPLE**

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## Teachers' Notes

The Active Math booklet represents a response to current trends in mathematics for the development of problem solving skills in students. The activities contained within the booklet are designed to interest and stimulate children in the 10 to 12 years age range. They are presented as blackline masters which are able to be photocopied for use in the classroom. Wherever possible the activities are stand alone worksheets although occasionally other materials such as grid paper, glue or card may be required.

### Problem Solving Strategies

The activities in the Active Math booklet are thematically grouped and are so structured as to provide an increasing level of difficulty with each successive sheet in the theme. Obviously gifted children in lower years, or less able children in higher years, will both find the structured problems equally challenging.

Knowledge of the problem solving abilities of the students is essential, in order that each child can be presented with an activity which he or she feels comfortable solving and not become frustrated with, because of inappropriate matching.

Initially problem solving activities could be tackled in class groups. This establishes a framework from which the children can branch out to work in smaller problem solving groups and then ultimately, independently.

**This step by step approach uses a structured framework for tackling problems:**

1. Understand the nature of the problem.
2. Develop a strategy for solving the problem.
3. Carry out the chosen strategy.
4. Look back and check.

#### 1. Understand the nature of the problem.

- Ask questions about the problem.
- Edit out irrelevant details.
- Re-word the problem in simpler terms.
- Highlight key words or phrases.
- Find similar problems to model from.

#### 2. Develop a strategy for solving the problem.

- Discuss alternative strategies.
- Use concrete aids.
- Use pictures or scenarios.
- Use tables or patterns.
- Use logic.
- Guess, check and alter strategy accordingly.
- Use trial and error techniques.
- Eliminate inappropriate solutions.

#### 3. Carry out the chosen strategy.

- Use aids/materials to assist in the calculation.

#### 4. Look back and check.

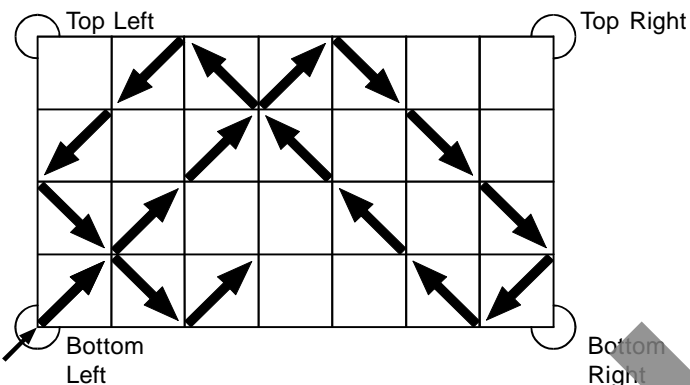
- Check that the problem has been fully answered.
- Discuss the solution and its feasibility.
- Be aware of alternative methods of solving the problem.
- Be able to present the steps leading to the solution.

Standard/s: Shape and space: Position and direction.

Name .....

# Pool Table Math - 1

- This is a special mathematical pool table. It only has pockets at the four corners and the surface is marked out as a 7 by 4 grid.



To play on this table you use only **ONE** ball.  
 This is hit from the bottom left-hand corner to strike and rebound off each cushion at an angle of  $45^\circ$ .  
 Complete the path of the ball until it meets a pocket.

Which corner pocket did the ball fall into? .....

How many times did the ball hit a side cushion? .....

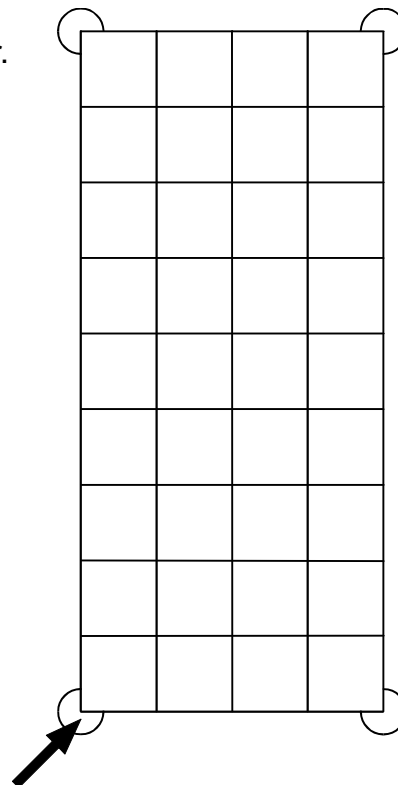
How many squares has the ball travelled across? (Don't forget to count the starting square.) .....

- Here is a second pool table marked as a 4 by 9 grid. Once again, the ball is hit from the bottom left-hand corner.

Predict which pocket the ball will fall into. ....

Test your prediction by tracing the path of the ball on the grid.

Were you right? .....



**Follow-up**  
 Find three pool table sizes where the ball will fall into the top left-hand pocket each time.  
 (Always start from the bottom left-hand corner!)  
 Draw your pool tables on grid paper.  
 Trace the path of each ball across the table.

Standard/s: Shape and space: Position and direction.

Name .....

# Pool Table Math - 2

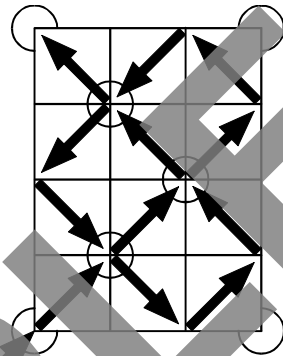
- Here is another special mathematical pool table. It only has pockets on the four corners and the surface is marked out as a 3 by 4 grid.

A ball was hit from the bottom left-hand corner of the table.

Its path was intersected 3 times (circled).

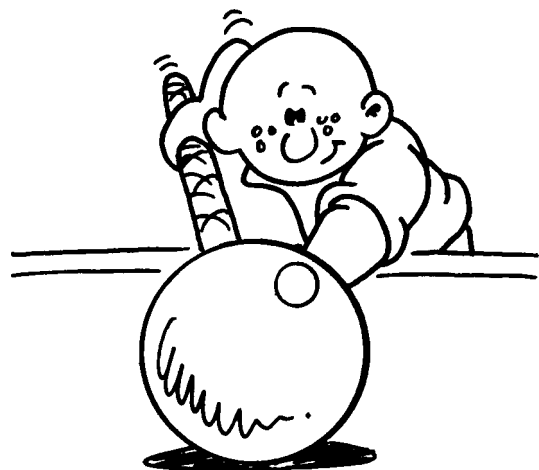
What will happen to the number of intersections if the length of the pool table is increased to 5 units?

.....  
 .....  
 .....



- Investigate using grid paper.
- Increase the length by another unit. Find the number of intersections and write them into this table of results. Repeat by increasing the length a further unit.

Length	Width	Intersections
1	3	
2	3	
3	3	
4	3	3
5	3	
6	3	
7	3	
8	3	
9	3	
10	3	



Explain any pattern you found in the number of intersections:

.....  
 .....

### Follow-up

Change the width of the pool table and repeat the investigation. Note any new pattern found.