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Nordic Math Class Competition
Nordic final

Problem 1

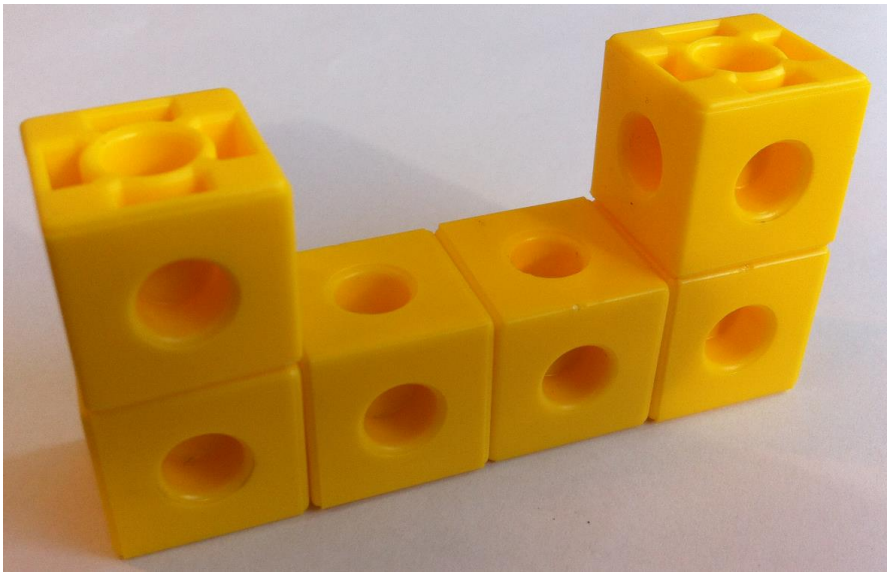
Solid figures of cubes

Equipment: Cubes

Make as many different shapes as you can with five cubes.
The shapes should have height 2, and it should not be possible to turn them so that the height becomes 1.

Show your solution by organizing the shapes on the table.

Example of a shape with height 2 that can be turned so that the height is 1. This is not allowed.



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Problem 2

Properties of a number

72 is the only number which is 8 times the sum of its digits.

Sum of the digits: 7 + 2 = 9

9 x 8 = 72

a) Which number is 5 times the sum of its digits?

b) It is possible to find numbers which are 7 times the sum of their digits.
How many can you find?

Show that your answers are correct.

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Answer sheet, problem 2 Country: _____

a) 5 times the sum of its digits

Number: _____ Sum of digits: ___ + ___ = ____ ___ • ___ = ____

b) 7 times the sum of its digits

Number: _____ Sum of digits: ___ + ___ = ____ ___ • ___ = ____

Number: _____ Sum of digits: ___ + ___ = ____ ___ • ___ = ____

Number: _____ Sum of digits: ___ + ___ = ____ ___ • ___ = ____

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Number: _____ Sum of digits: ___ + ___ = ____ ___ • ___ = ____

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Problem 3

Queen on a Chessboard

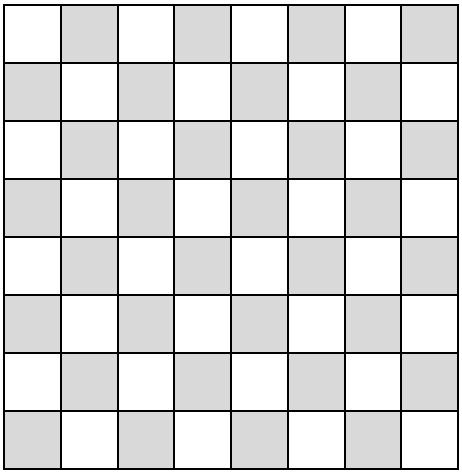
Equipment:

- 2 x 8 cubes
- Worksheet with 8 x 8 grey and white squares

A queen on a chessboard can move horizontally, vertically or diagonally as far as desired.

Place 8 queens on a chessboard so that they cannot ”hit” each other.

How many different solutions can you find?
Two solutions are the same if they can be reflected or rotated to be the same.



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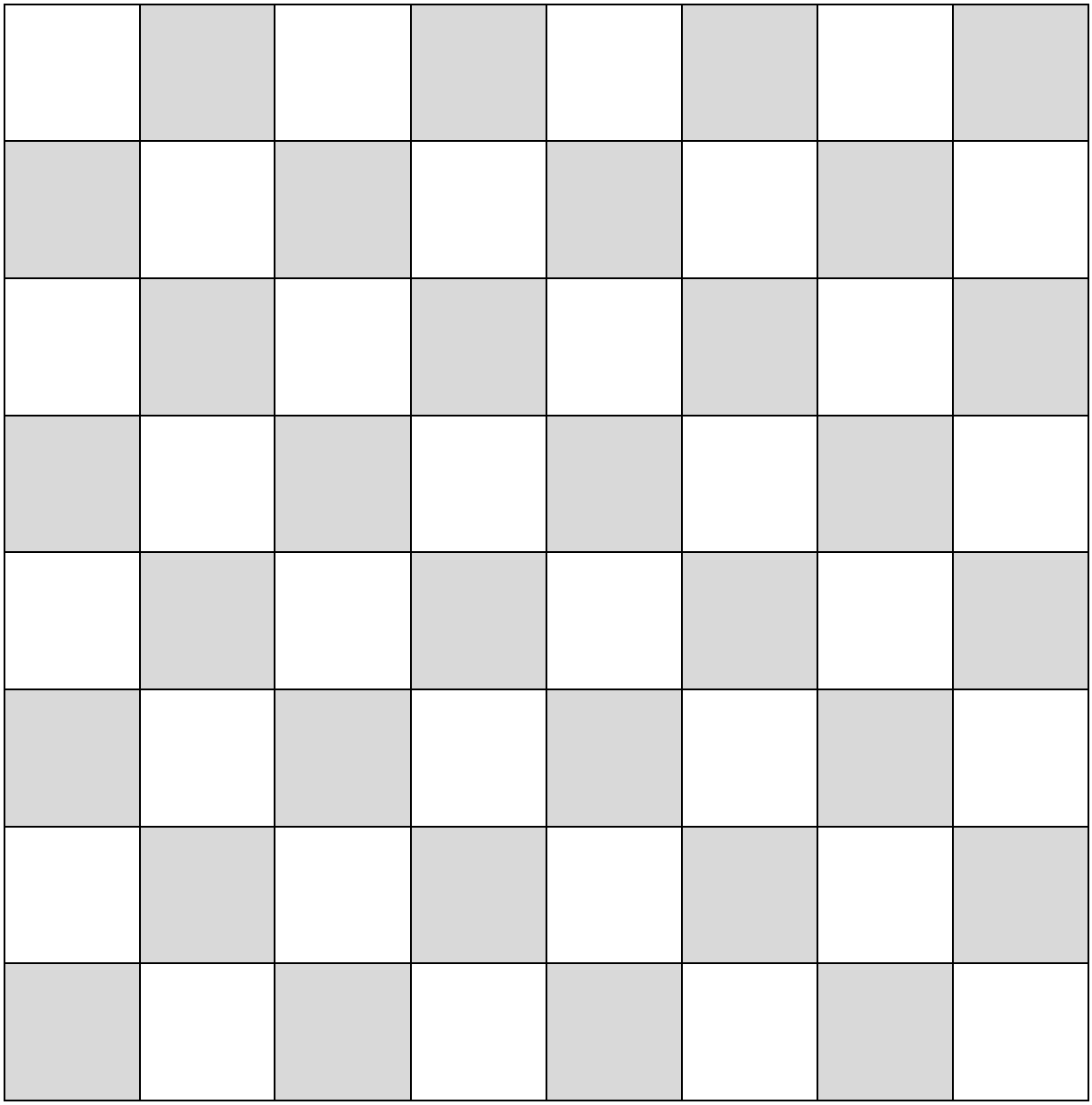
Work sheet. Chessboard, problem 3



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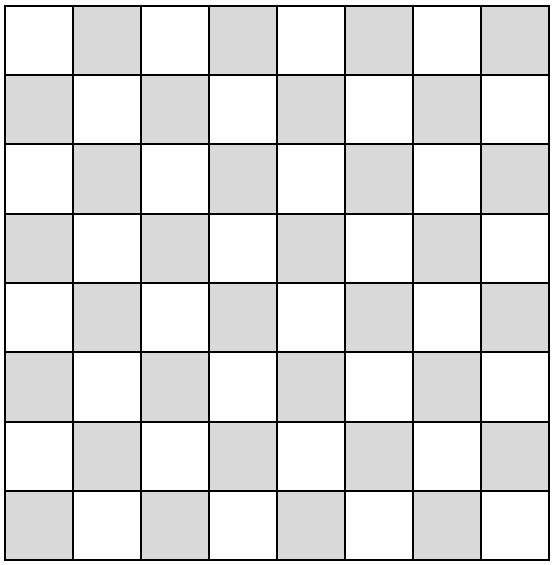
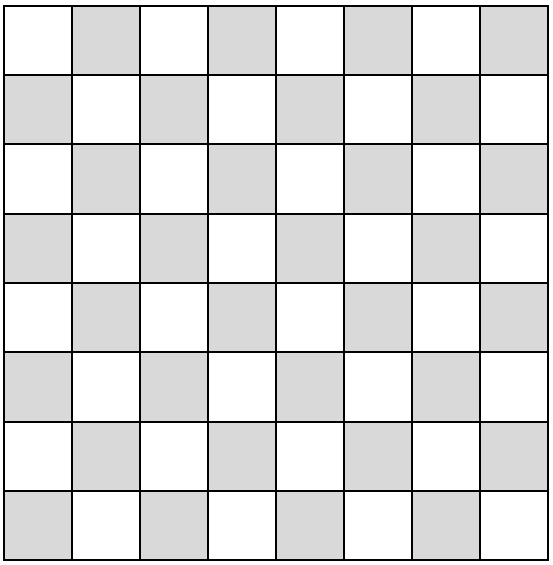
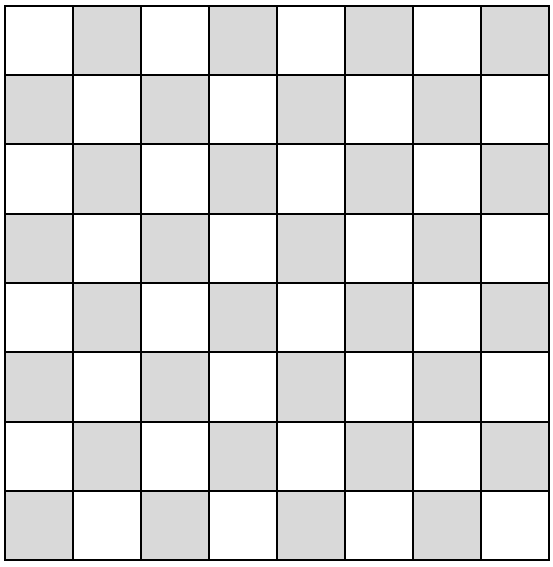
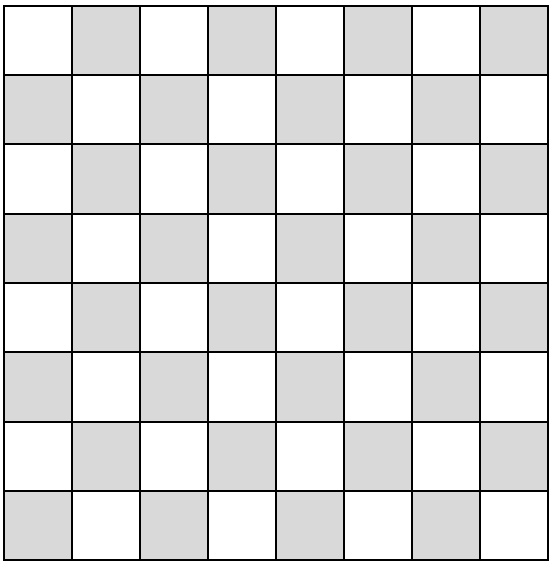
Answer sheet, problem 3 Country: _____

Place X's to show where the pieces can be.









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Problem 4

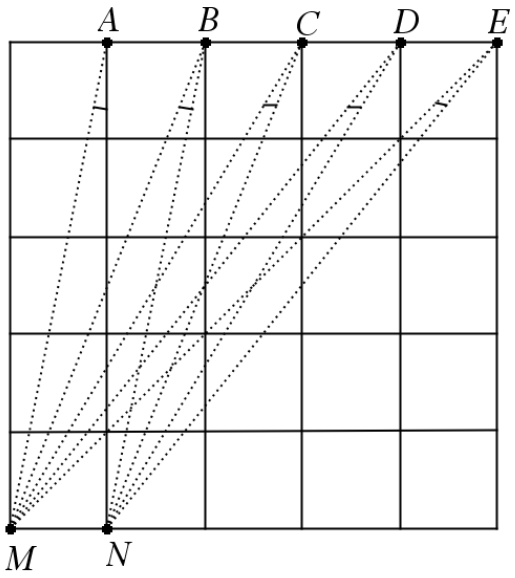
Sum of angles

Equipment:Worksheet

A square can be divided in 25 smaller squares. See the figure.

What is the sum of the five angles
MAN , MBN , MCN , MDN and MEN?

State your reason for the answer.



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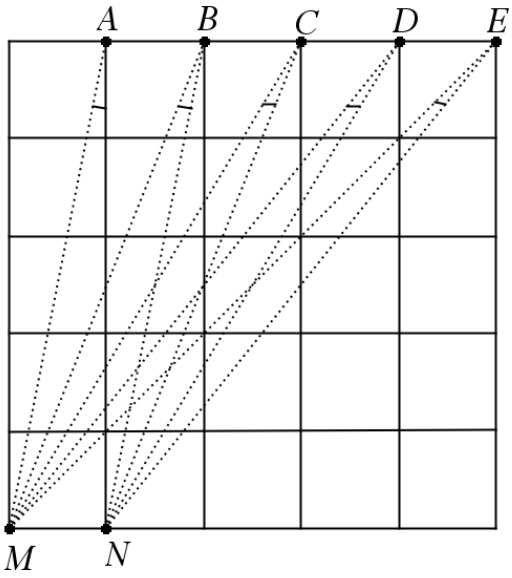
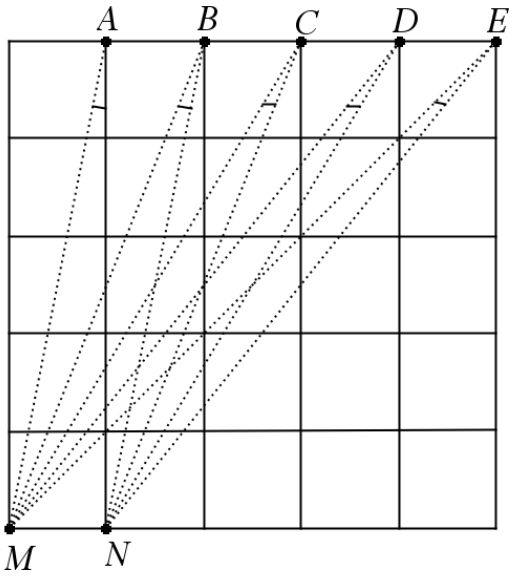
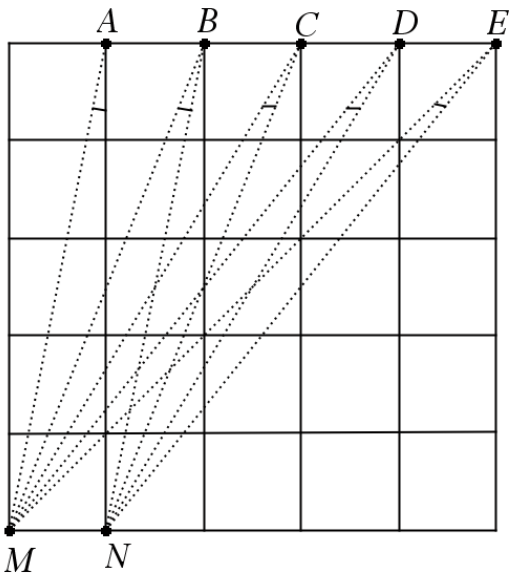
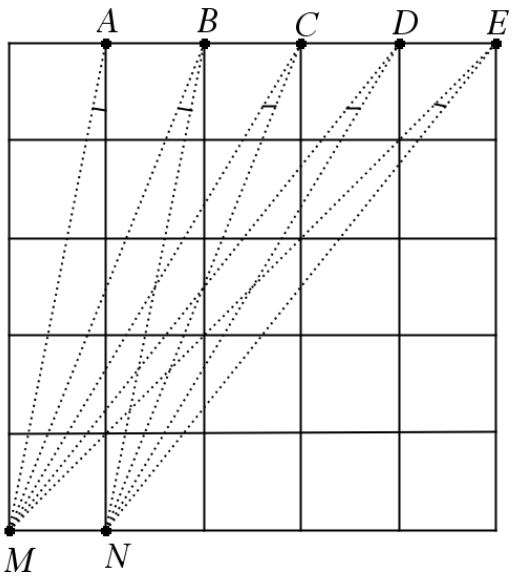
Work sheet. Figure, problem 4









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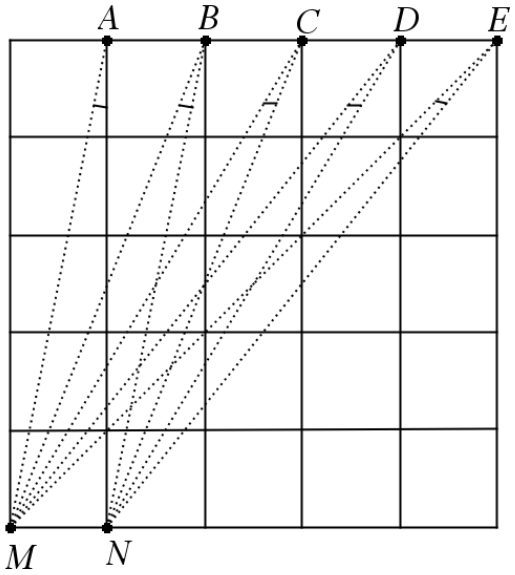
Answer sheet, problem 4 Country: _____

Sum of angles _____

Reason:
(Show on the figure if that makes it easier to explain)



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Problem 5

Addition puzzle

Equipment:

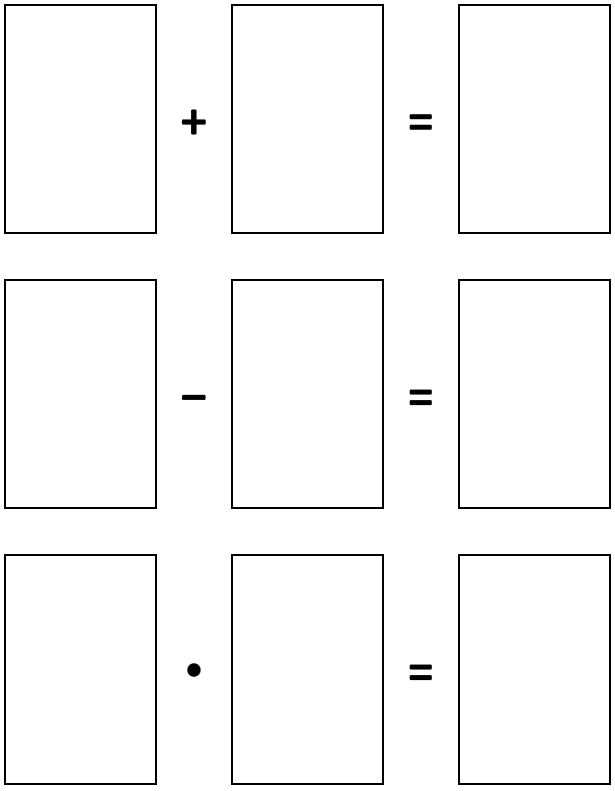
- Cards with values 1-9, two sets
- Two sheets with boxes and calculation symbols to set cards on.

a)
Arrange 9 cards in this system so that the figure shows a correct calculation.

You can, for example, set 1, 2 and 3 in the first row because 1 + 2 = 3.
(But it is not certain you will be able to complete the other two rows if you begin this way.)

Don't give up too soon!
It is possible to solve!

b)
Show that there is only one correct solution.



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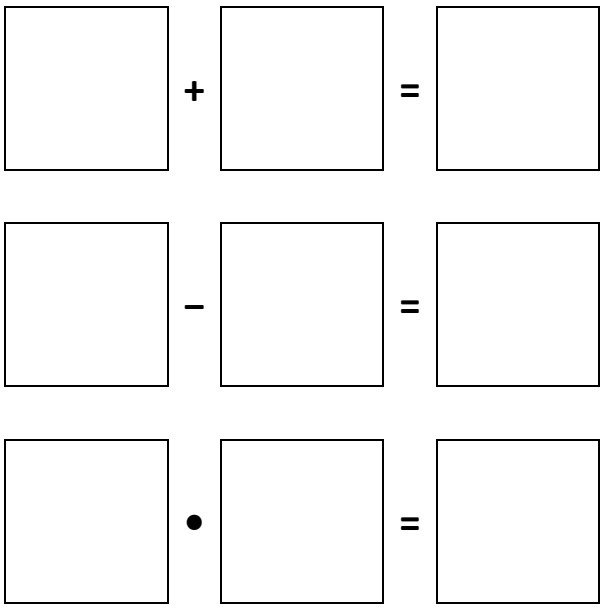
Work sheet problem 5



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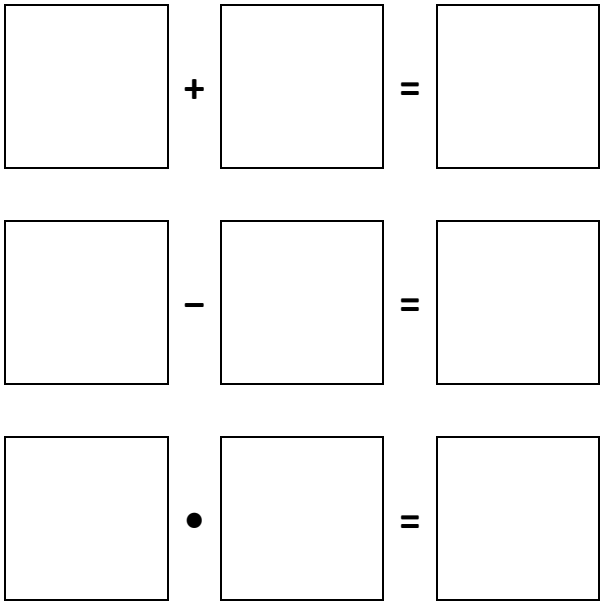
Work sheet problem 5



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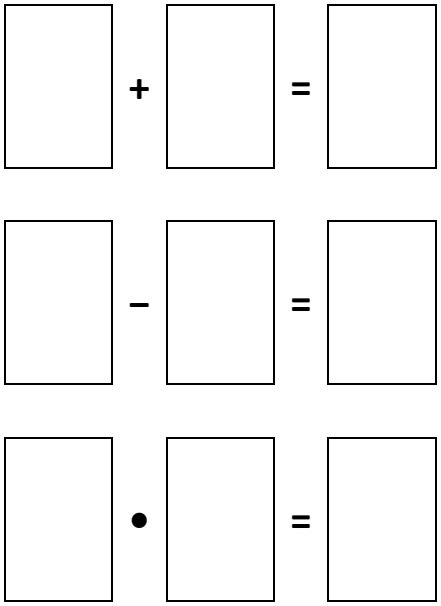
Answer sheet, problem 5 Country: _____

a)



b) Reason that there is just one solution.

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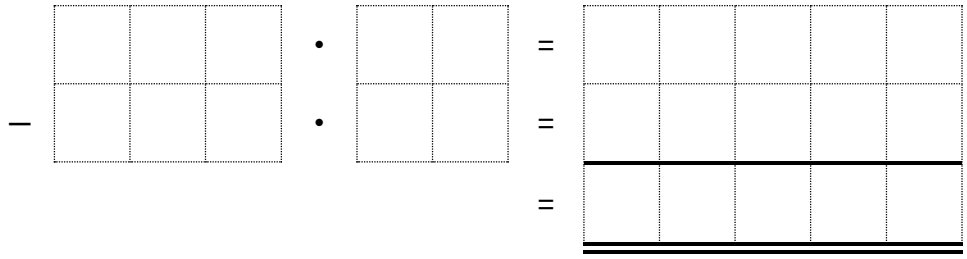
Extra problem

Least possible difference

Equipment:

- Calculator
- Two sets of number tiles 0-9
- Work sheet to set number tiles on



Place the digits 0-9 so that the difference between the products is the least possible.

Hand in your answer on this sheet.

Comments
If teams have the same difference, the winner is the team that hands in the answer first.

After the first team has handed in an answer,
the remaining teams have one minute to hand in their answers.

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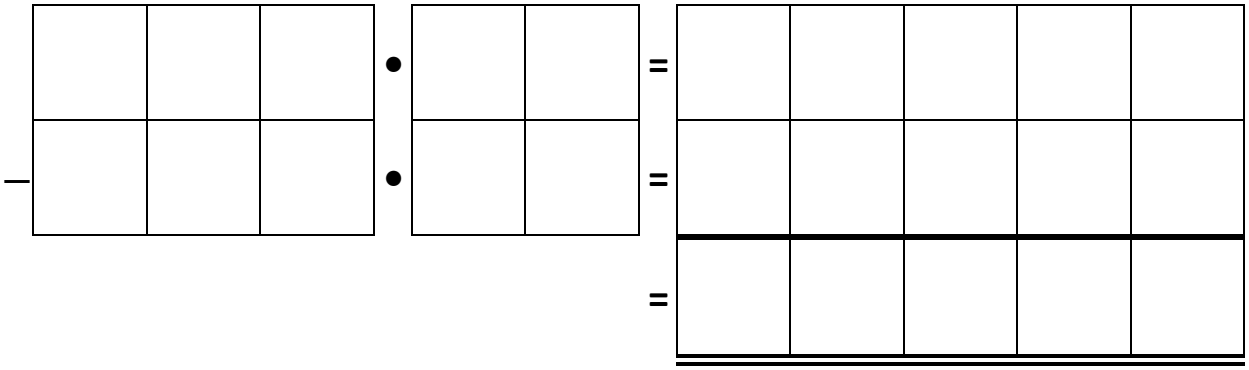
Work sheet, Extra problem

Form to set number tiles on



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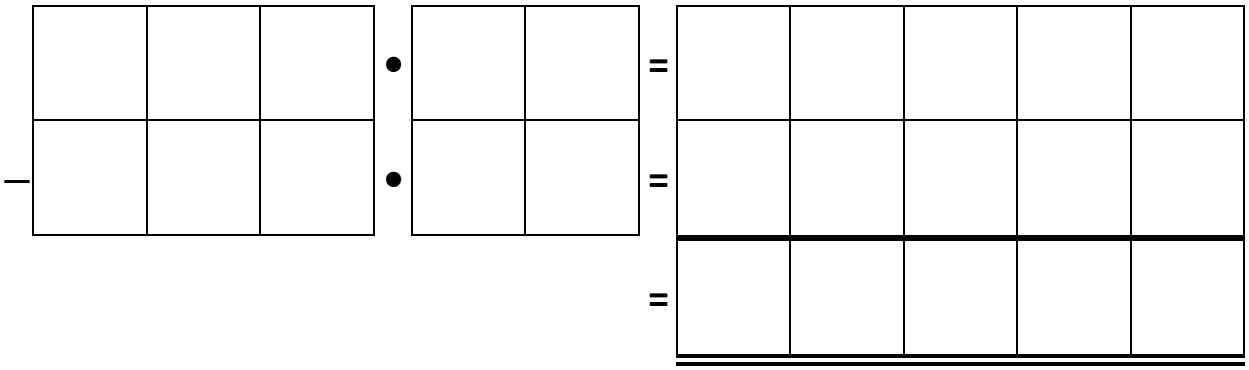
Work sheet, Extra problem

Form to set number tiles on



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Work sheet, Extra problem