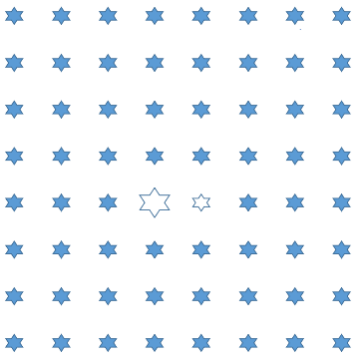
Task 1

The Star Path

Equipment: Work sheets with the stars.

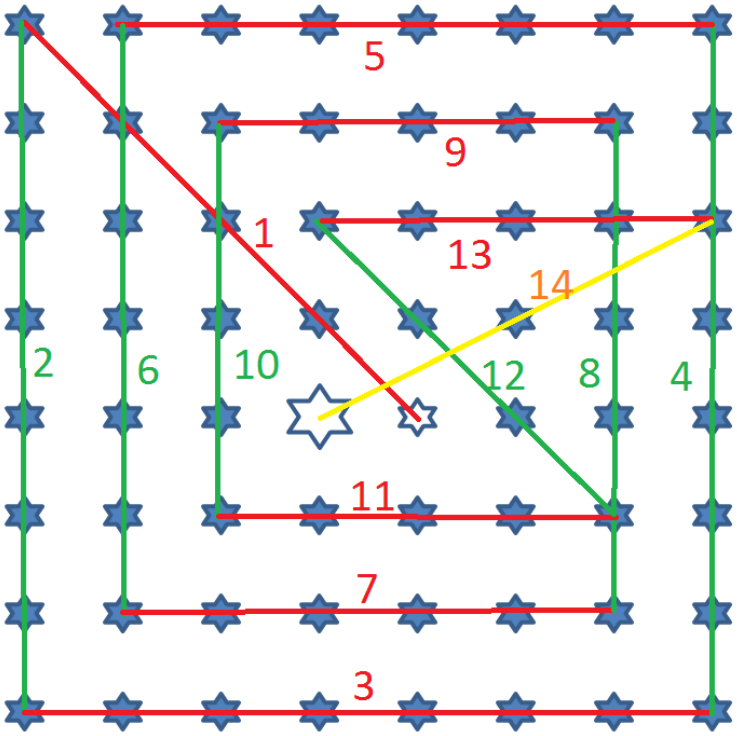


Start at the small white star.

Then draw the fewest number of connected straight lines that will pass through each blue star and end on the big white one.

It is OK to let the lines cross each other, and you can pass through a star more than once.

Answer **Country:** _____



Task 2

Three coins

Equipment: Three 1 euro coins

Joe to Jim: «I'm going to toss three 1 euro coins in the air 40 times.
If they all fall either heads or tails, I will give you 2 euro.
But if they all fall any other way, you have to give me 1 euro."

Was it wise for Jim to accept the bet?

Give a reason for your answer.

Answer Country:

It is not wise for Jim to accept the bet.

Possible outcomes:

Coin 1	Coin 2	Coin 3	Winner
H	H	H	Jim
H	H	T	Joe
H	T	H	Joe
T	H	H	Joe
H	T	T	Joe
T	H	T	Joe
T	T	H	Joe
T	T	T	Jim

Joe is the winner 6 out of 8 times. Jim is the winner 2 out of 8 times.

Joe: 6 x 1 € = 6 € Jim: 2 x 2 € = 4 €

In the long run Joe will win 1,5 times more than Jim.

Task 3

Points at a ball

Equipment:

- A ball of Styrofoam
- Needles with colored heads
- Thread

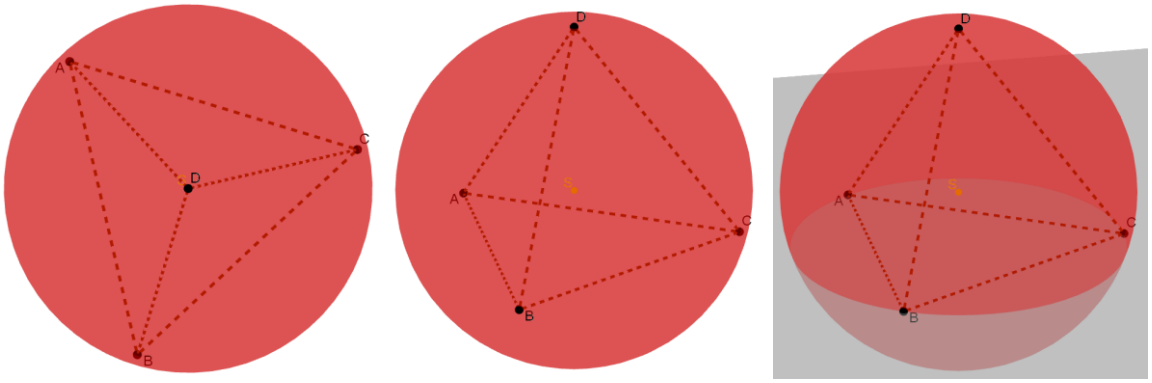
What is the largest number of points that can be placed on the surface of a ball in such a way that every point is exactly the same distance from every other point – measured on the surface of the ball?

Show you solution on the ball. Use needles to represent points and thread to represent lines.

The solution with the equipment does not have to be accurate, so you have to give a short explanation of your idea.

Answer Country:

Four points in the corners of a tetrahedron inscribed in the ball.



Task 4

The Monkey and the Coconuts

Three sailors are shipwrecked on an island and collect a large pile of coconuts during the day.

That night the first sailor wakes up and decides to take his first share early. He tries to divide the pile of coconuts equally into three piles, but finds that there is one coconut left over. He tosses the reminding coconut to a monkey and then hides "his" one of the three equally sized piles of coconuts. Then he pushes the other two piles together to form a single visible pile of coconuts again and goes to bed.

To cut a long story short, the two other sailors in turn gets up once during the night and performs the same actions of dividing the coconut pile into three, finding that one coconut is left over and giving that single remainder coconut to the monkey.

In the morning the remaining coconuts are divided into three equal piles for each of the sailors, whereupon it is found that the pile of coconuts divides equally amongst the sailors with no remainder. Nothing for the monkey in the morning.

Calculate the minimum possible size of the initial pile of coconuts collected during the first day.

Solution

The sailors collected 25 cocnuts.

The first sailor divided in 3 x 8 + 1 and made a pile of 2 x 8 = 16.

The second sailor divided in 3 x 5 + 1 and made a pile of 2 x 5 = 10.

The third sailor divided in 3 x 3 + 1 and made a pile of 2 x 3 = 6.

In the morning the sailors divided in 3 x 2.

Task 5

Exact number of points

Equipment: Work sheets with the numbers.

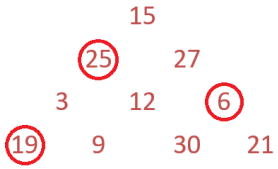
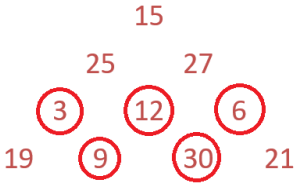
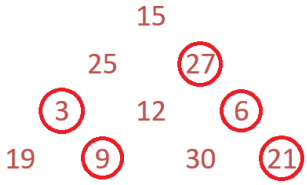
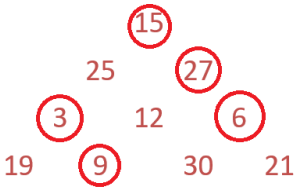
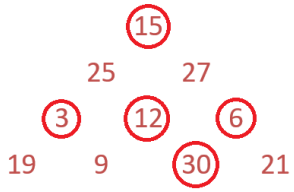
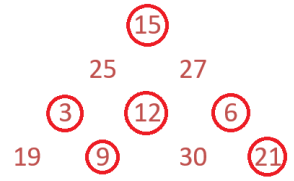
Study the numbers in the triangle.

The challenge is to find numbers with a specific sum.

Use as many numbers as you can for each of the following sums: 50, 60, 66.

Mark the numbers with circles.

Solutions

SUM 50	SUM 60	SUM 66
		
		
		

Extra Task

Three special numbers

Equipment: Two sets of cards with digits 1-9

The example shows three numbers made by the digits 1-9.

192
384
576

The numbers have these characteristics:

- The number in the middle is two times the number at the top.
- The number at the bottom is three times the number at the top.
- The number at the bottom is equal to the sum of the other two.

There are three other ways to place the digits 1-9 so that we get three numbers with the same characteristics.

The winner is the team who first finds one of the other solutions.

Solutions

267	327	273
534	654	546
801	981	819