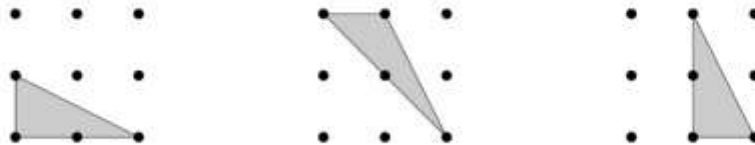


Problemo Questions – Level 1

Triangles 3

In a 3×3 grid of points, many triangles can be formed using 3 of the points as vertices?

Three such triangles are shown below.



Of all these possible triangles, how many have all three sides of different lengths?

Dots 1

A 3 by 5 grid of dots is set out as shown.



How many straight line segments can be drawn that join two of these dots and pass through exactly one other dot?

14

20

22

24

30

Circle 1

Eighteen points are equally spaced on a circle, from which you will choose a certain number at random.

How many do you need to choose to guarantee that you will have the four corners of at least one rectangle?

Bookshelf

Petra has three different dictionaries, and two different novels on a shelf.

How many ways are there to arrange the books if she wants to keep the dictionaries together and the novels together?

12

24

30

60

120

Prisms

Two rectangular prisms are constructed.

One measures $4\text{cm} \times 6\text{cm} \times x\text{cm}$ and the other measures $3\text{cm} \times 8\text{cm} \times y\text{cm}$, where both x and y are integers.

If they have equal surface area, what is the smallest possible value of $x + y$?

11

21

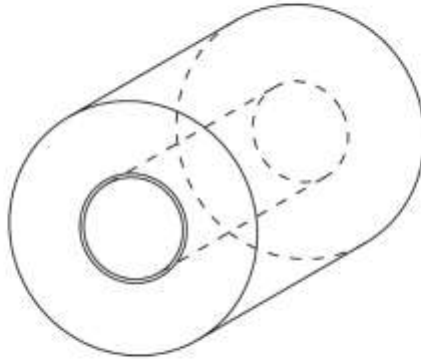
26

42

63

Tube

Thanom has a roll of paper consisting of a very long sheet of thin paper tightly rolled around a cylindrical tube, forming the shape indicated in the diagram.



Initially, the diameter of the roll is 12 cm and the diameter of the tube is 4 cm.

After Thanom uses half of the paper, what is the diameter of the remaining roll to the nearest centimetre?

6 cm

8 cm

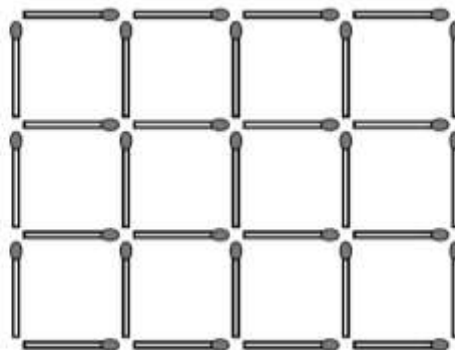
8.5 cm

9 cm

9.5 cm

Matches

As shown in the diagram, you can create a grid of squares 3 units high and 4 units wide using 31 matches.



I would like to make a grid of squares a units high and b units wide, where $a < b$ are positive integers.

Determine the sum of the areas of all such rectangles that can be made, each using exactly 337 matches.

Father and son

Today the product of the ages (in integers) of a father and son is 2015.

What is the difference in their ages?

26

29

31

34

36

Alphabet

Given five different positive integers a, b, c, d, e , we know that $c : e = b$, $a + b = d$ and $e - d = a$.

Which of the numbers a, b, c, d, e is the largest?

a

b

c

d

e

Dice 3

Bibi has a die with the numbers 1, 2, 3, 4, 5, 6 on its six faces.

Tina has a die which is special: it has the numbers 2, 2, 2, 5, 5, 5 on its six faces.

When Bibi and Tina roll their dice, the one with the larger number wins.

If the two numbers are equal, it is a draw.

What is the probability that Tina wins?

$\frac{1}{3}$

$\frac{7}{18}$

$\frac{5}{12}$

$\frac{1}{2}$

$\frac{11}{18}$

KLR

If $K = L + \frac{6}{R}$ and $L = 4$ and $K = 7$, then R equals

- 18

1

12

8

2

Fractions 3

If $\frac{p}{p-2q} = 3$ then $\frac{p}{q}$ equals

-3

3

$\frac{1}{3}$

$\frac{2}{3}$

2