THE 2022 YOUNG MATHEMATICAL STORY AUTHOR (YMSA) COMPETITION

THE STUART J. MURPHY AWARD
(THE 8-11 YEARS OLD CATEGORY)

WINNER

'We Are Different But the Same' by Miriam Iannazzi (11 years old)
at Southlands British School Rome (Italy)

You can read the author's inspiration for the story and the judges' comments
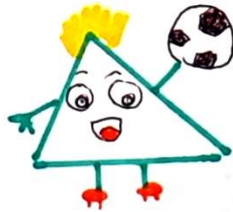on:

www.mathsthroughstories.org/ymsa2022

#YMSAMaths

We
ARE are
DIFFERENT
but the
Same

In the little town of Shapeville, lived many flat shapes, all different from one another, but all good friends and living together in happiness.

In the Triangle family everyone had three sides. Dad Scalene had his left side much longer than his right; mum Isosceles was tall and thin with two equal sides; their two little twins, Equilateral and Equiangular, had their three sides all equal. Their beloved uncle, Right Triangle, was also living with them.
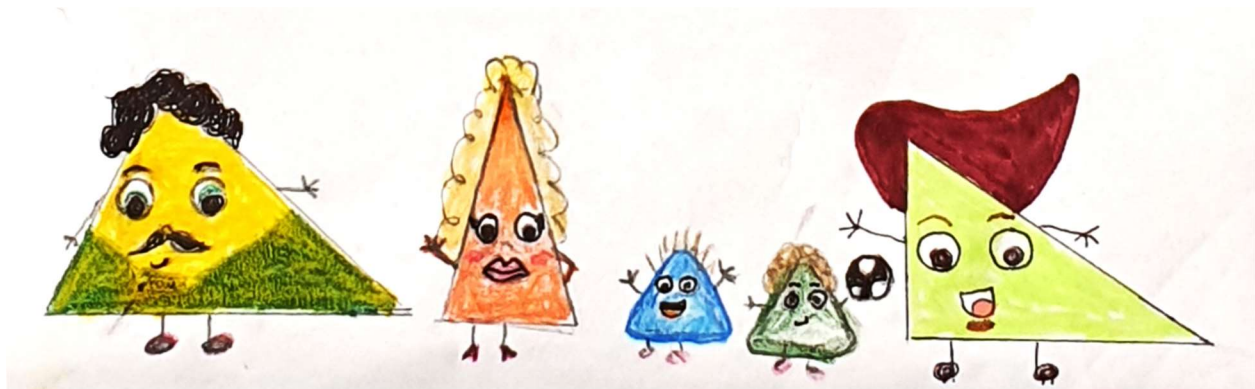
Cross the street lived their neighbours, the Quadrilaterals fam, with mum Rhombus, dad Rectangle and their beloved son Parallelogram, who loved to eat sweets and sandwiches, especially those with hamburgers and bacon, even better if served with French fries. The Quadrilaterals looked different than the Triangles as they were all born with four sides.
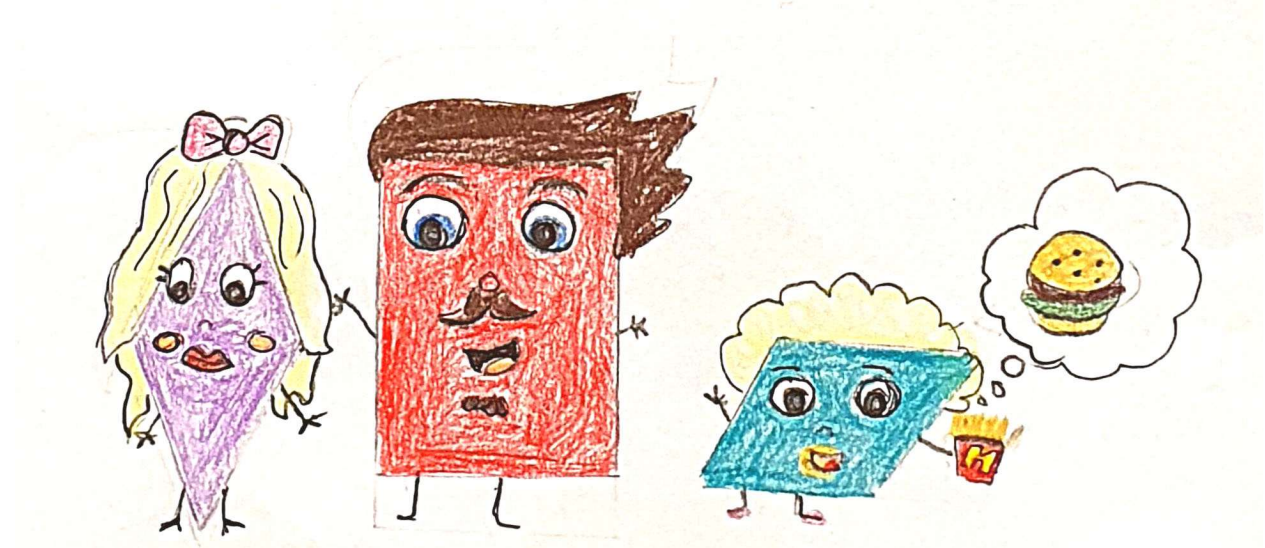
Even though they looked different, the Triangles and Quadrilaterals got very well together and the three kids loved to play together as best friends.

On a beautiful, sunny day, the two families went to the park to spend some good time together and do some exercise.

Equilateral and Equiangular were thumbling together, head to toe, when Parallelogram suddenly shouted "Hey, you two together right now look exactly like me!" and took a very nice picture with his camera to prove that.
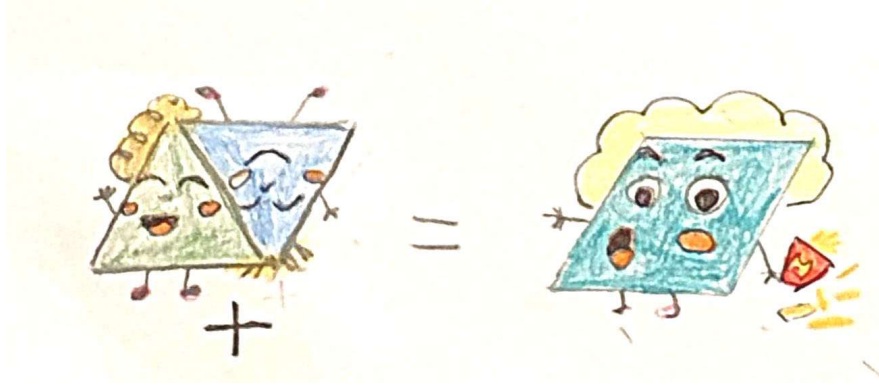
Mr Trapezius, an old teacher from Shapeville that was sitting on a bench, close to the kids, happily joined the conversation explaining:

"This is right, if you take two identical equilateral and equiangular triangles and put one upside down versus the other, joining them by one side, you will get a parallelogram."

"Really?" the 3 friends asked together.

"Yes! And since you seem really curious to learn more, I will also tell you that this is why the area of a triangle is obtained as the area of the parallelogram having the same base and height and then dividing it by two."

Area of the parallelogram = b x h   Area of the triangle = $\dfrac{b \times h}{2}$
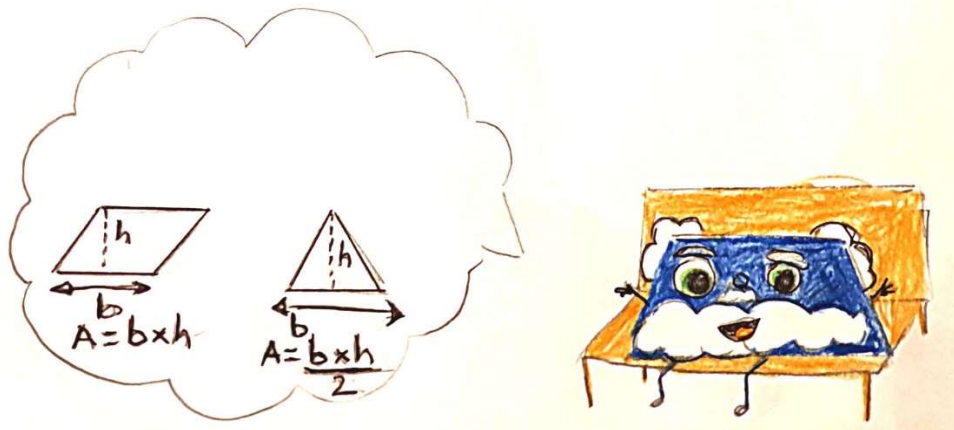
After thanking the old teacher for the clear explanation, Equilateral triangle could not refrain from commenting it further: "Dear friend Parallelogram, you're twice as big because you keep eating all those sandwiches and fries!"

Meanwhile, Mrs Isosceles and her friend Mrs Rhombus decided to go for a walk till the nice pond that was just round the corner.

The pond looked like a perfect circle, with its transparent, still water and the two ladies moved closer. When Mrs Isosceles looked more attentively at the pond, she could see herself reflected into the water and… she could hardly believe to her eyes when she realized that doubled with her reflection she looked just like her friend, Mrs Rhombus, who was close by.

"Look! I never thought that if I duplicate myself I could become a Rhombus like you, my dearest friend!"


Mr Trapezius, the old teacher, suddenly appeared near the two mums and started explaining:

"This is right, if you take two identical isosceles triangles and join them by their base, you will get a rhombus."

He then added "This is why the area of a rhombus is obtained by doubling the area of one of the two triangles that make it.

Area of the triangle = $\dfrac{b \times h}{2}$

Area of the rhombus = $\dfrac{b \times 2h}{2}$ or $\dfrac{d \times D}{2}$ (where d is the smaller diagonal and it's equal to the base of the two triangles, while D is the longer diagonal and it's equal to two times the height of the triangle)."
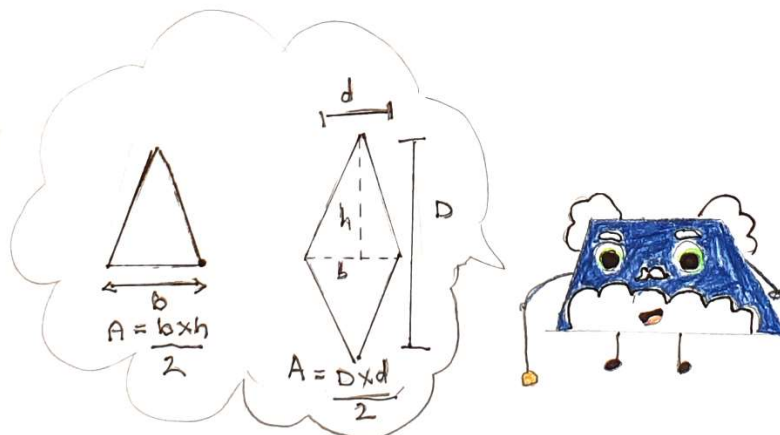
"Thank you dear sir, we really appreciated your explanation, you cleared all our doubts from many years ago, when we were at school", Mrs Isosceles and Mrs Rhombus happily said together.

In a different area of the park, Mr Scalene, Mr Right Triangle and Mr Rectangle were doing some exercise.

Mr Scalene was sitting on the grass, stretching and trying to touch his feet with his hands.

As he leaned back, with his back straight, Mr Rectangle, who was nearby, screamed with surprise:

"With your back so straight you now look like your brother, Right Triangle!".
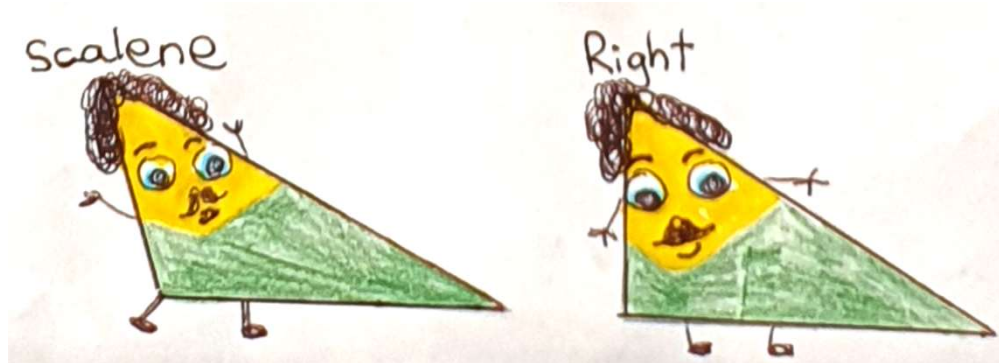
As the two brothers (Scalene and Right Triangled) got closer and hugged each other, not only they looked the same, but joined together they then became an exact copy of their friend Rectangle.
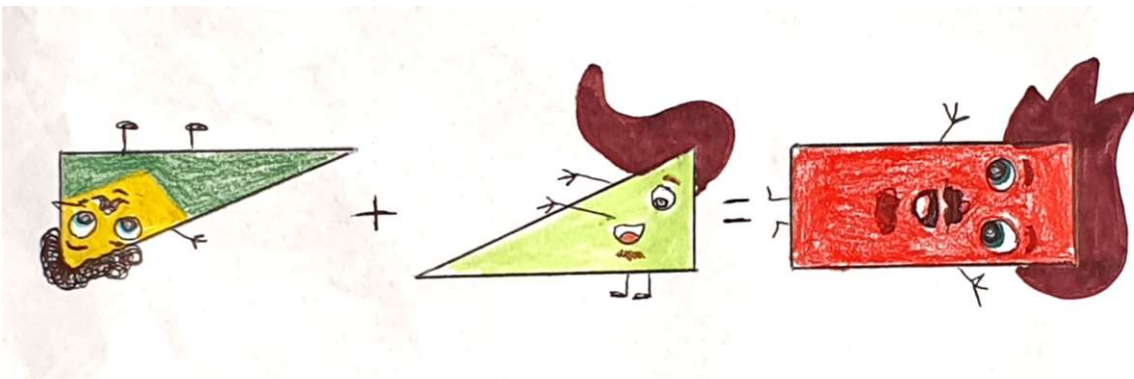
Once again Mr Trapezius, the old teacher, appeared unexpectedly behind the three men and added:

"A right triangle has in fact two sides which are perpendicular at each other, forming a right angle. Also, if you take two right triangles and join them together by their longest side, which is called hypotenuse, you will get a rectangle whose area will be double the area of each of the right triangles."

Area of the rectangle = $b \times h$ 　　　　　　　　　　Area of the triangle = $\dfrac{b \times h}{2}$

As the two families gathered together for a picnic, one noisy bee invited herself to the meal.

The two little twins were scared to death, while their friend Parallelogram was eager to find out where the bee was coming from and started patiently following her, until she buzzed back to her beehive.

Looking closely to it, Parallelogram discovered that it was made of many small cells.

Mr Trapezius, who magically appeared behind him, was happy to explain:

"As you can see, each cell of the beehive has an hexagonal shape. This is because the hexagons fit together very well to make a robust structure. But also because the geometry of this shape uses the least amount of material to hold the most weight and therefore be more robust. It takes the bees a lot of effort to build their beehive."

Parallelogram sounded really amazed with all the information and even more when the old teacher added:

"A regular hexagon is made of 6 equilateral triangles and its area is therefore calculated multiplying the area of each triangle by six."
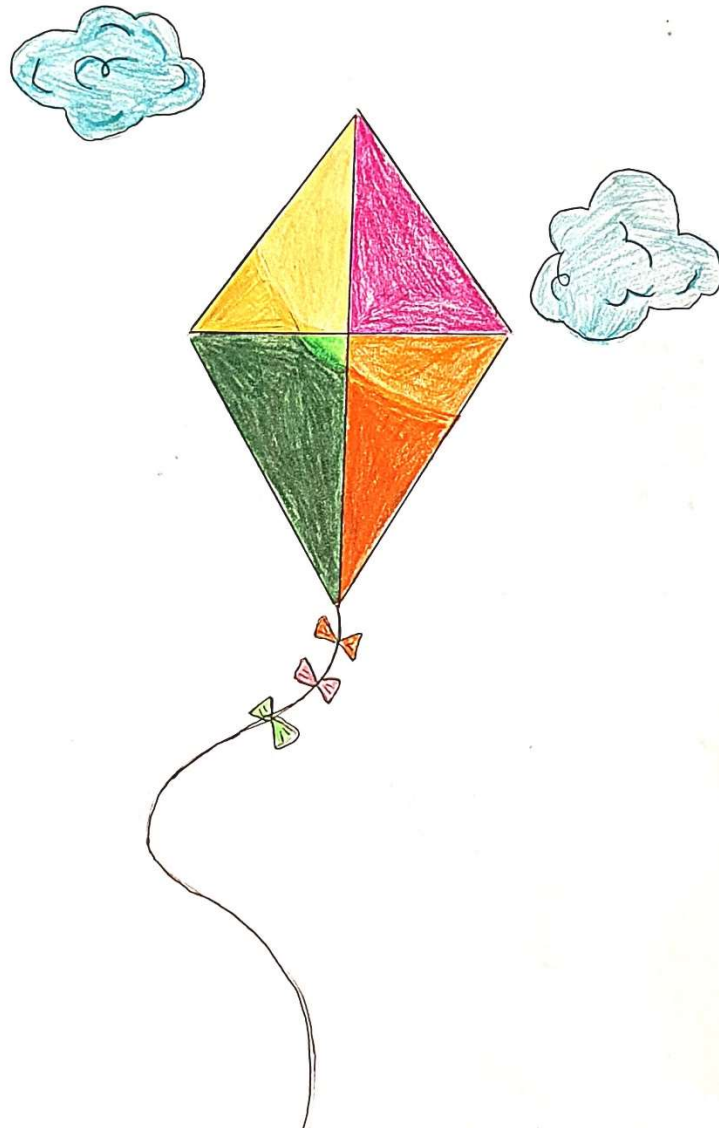

$$A_{tot} = 6 \times A_1$$

$$A_1$$
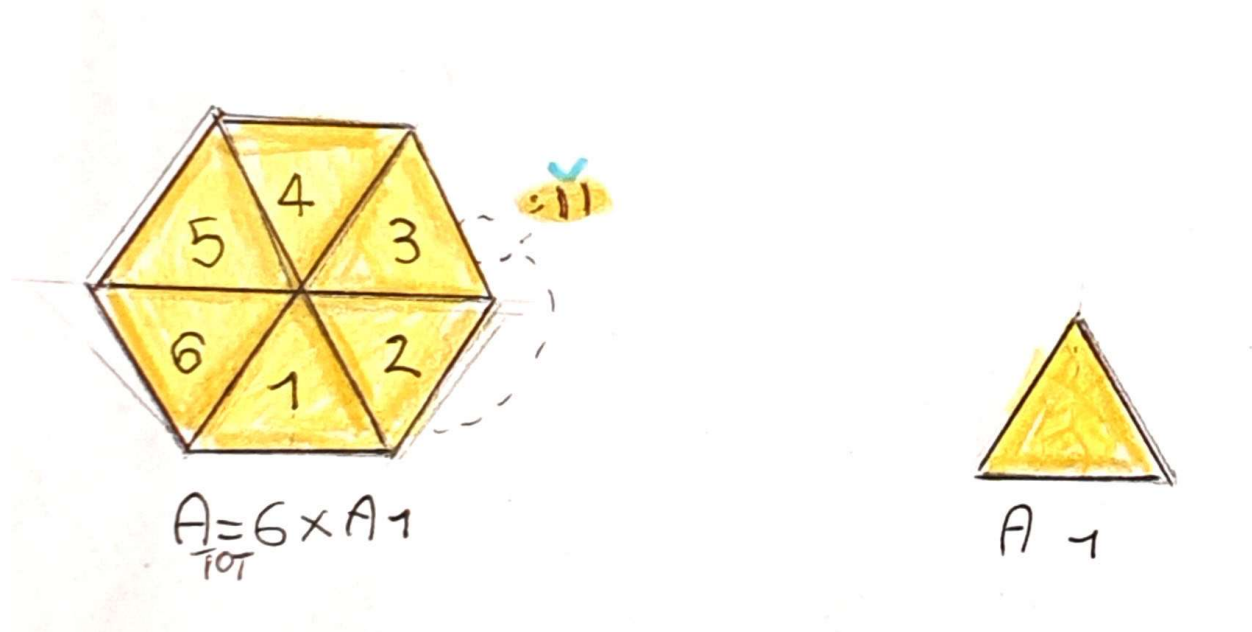
"You see my dear kids, as 2D shapes we can combine members of different families and form new shapes, so it's important you understand that **we're all different in shape, but also the same!**"

"With all the great things I learnt this morning I'm really hungry now and cannot wait to eat my sandwiches", said Parallelogram. And then he invited the wise old teacher to eat with them.

Once finished eating, the two families and Mr Trapezius decided to conclude the day building a nice and coloured kite, one additional 2D shape that everyone loves, and spent the remaining of the day having fun with it altogether!

THE END