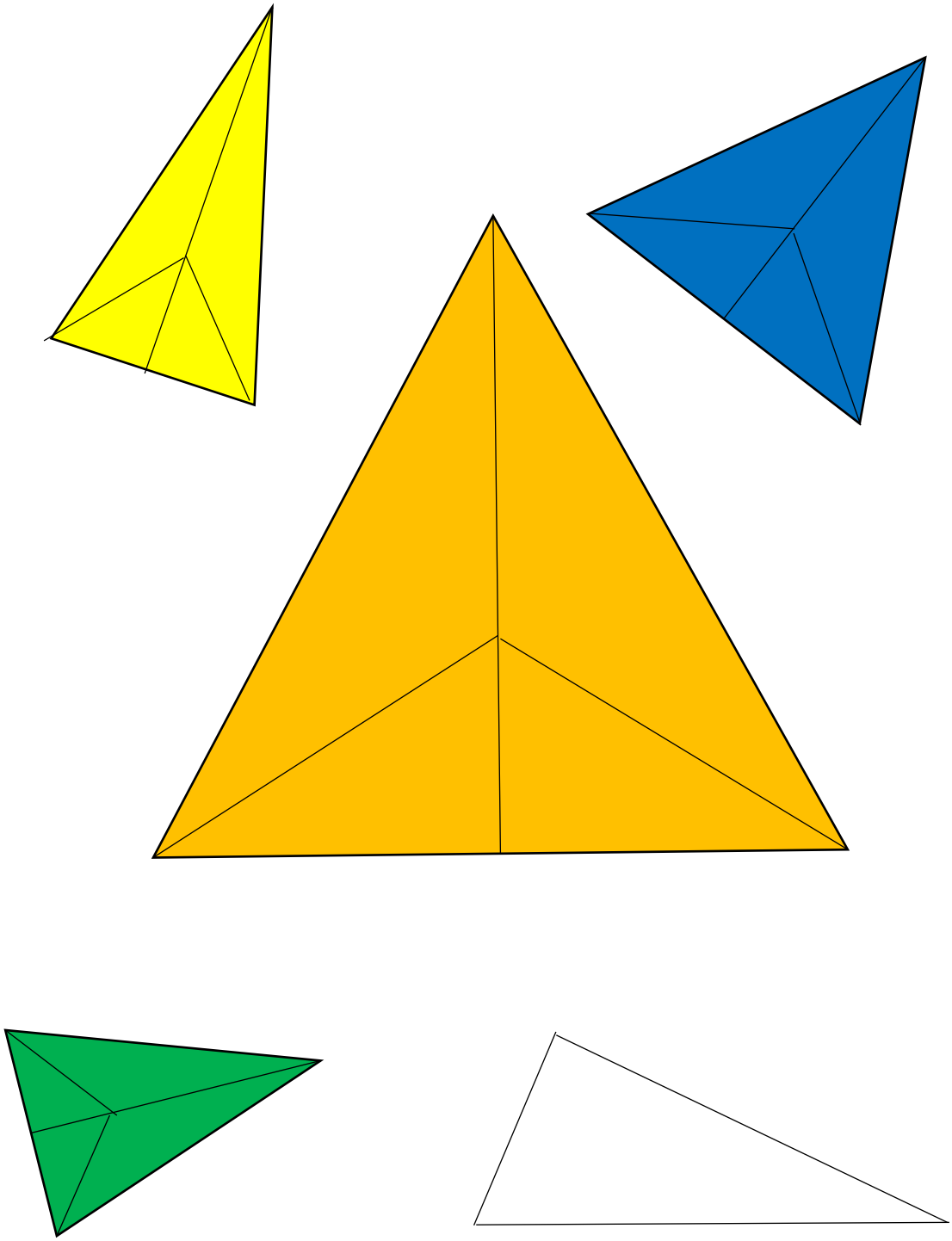
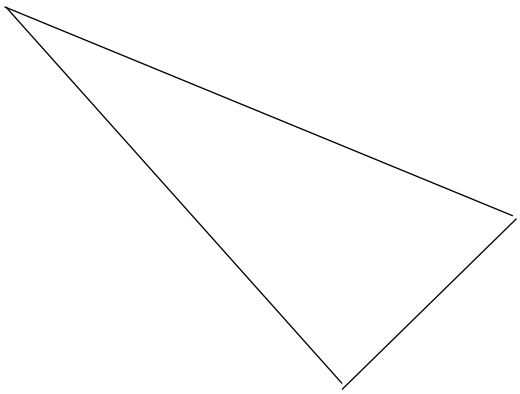
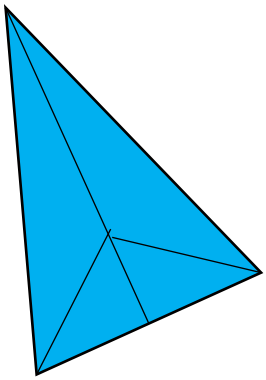
‘Equal-area’ points of triangle

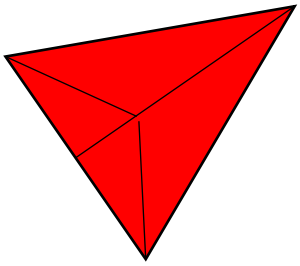
(Written by Kyle Wang, Albert Suen and Joshua Li)



Content page



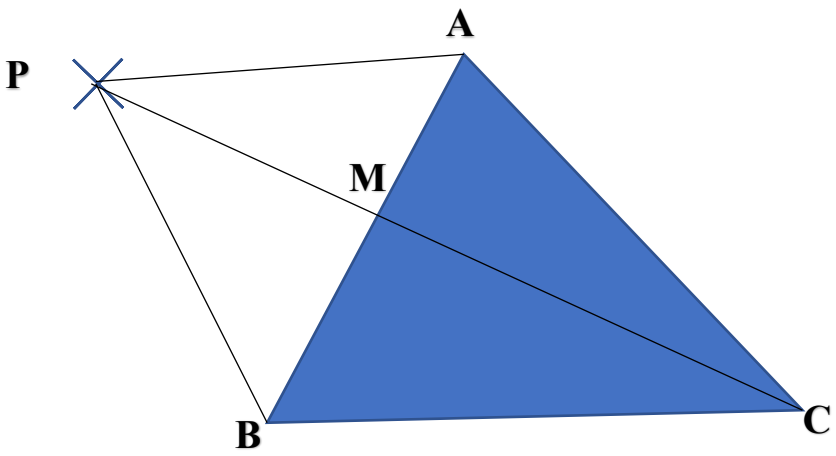




Introduction

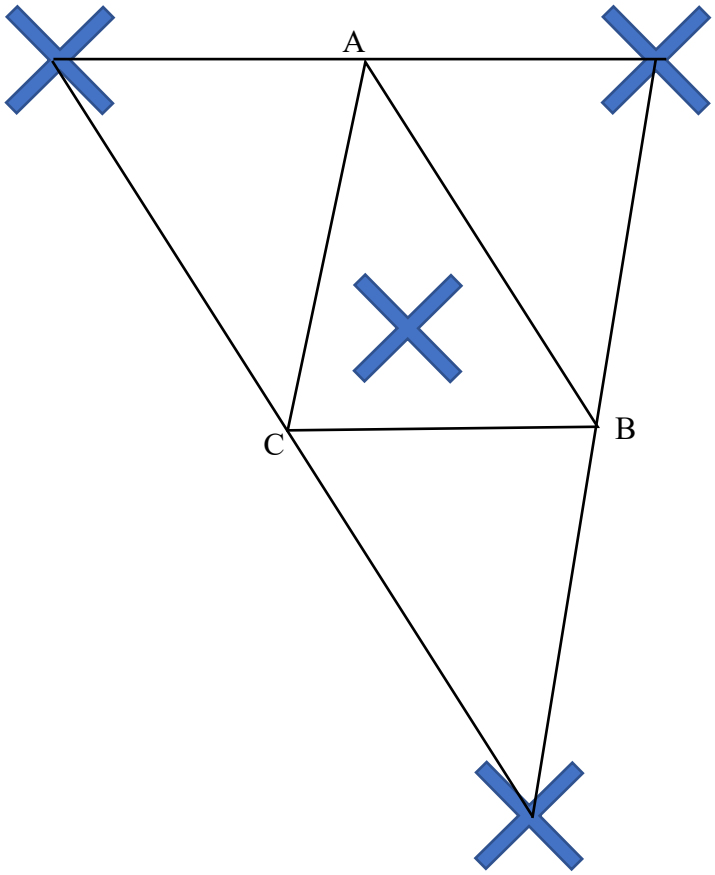
A triangle has three sides. If there is a point *P* on the plane, we can connect the vertices of the triangle to *P* in order to form three triangles. Is it possible to find *P* such that the three triangles formed is having the same area?

In this project, we are going to find the 'equal area' points *P* on a plane. We start our investigation from a more symmetric triangle – equilateral triangles, trying to find all the 'equal area' points *P*. Then we may turn to isosceles triangles and lastly try to see if there is any simple way to find all the 'equal area' points for a general scalene triangle.



Summary

In conclusion, in any ΔABC, there are four and only four possible points O which can make the area of ΔAOB = area of ΔBOC = area of ΔCOA. Among them, one point is inside ΔABC. We can find then by finding the weight of mass or the centroid of ΔABC. Three points are outside ΔABC, we can find them by forming parallelogram $OACB$, $OBAC$ and $OABC$.



Reflection

Albert Suen

In this project, I learnt that the centre points of every kinds of triangle are the same, they are all 1/3 of the height of the triangle. That is very helpful in order to increase my Mathematics skills. Also, I am very happy that we can work this project together and complete this. This is a wonderful experience and I hope there will be another time for us to do a project together.

Joshua Li

When I was first informed to take part in this project, I was shocked and surprised. The knowledge used in this project haven't been taught before. Yet, with the support of my teacher as well as my classmates, I find the solutions step by step. Proving the mid points of triangles are definitely not a cup of tea, it requires a deep understanding of relationships between the height, base and ultimately the area of triangles. Hence, not only I have learnt the method to prove triangles. More importantly, I have learnt that we should try again and again towards unknowns, even if we find it difficult or easy

Kyle Wang

After doing this project, I have learnt several things. First, I have learnt how to find on equal-area point of an triangle, which is the main purpose of our project. Second, I have learnt more skills in operating the Microsoft WORD, the software I used to finish the project. Third, I have learnt how to do this kind of research. We can start with something that is the simplest, such as equilateral triangle or a square. And the most sophisticated object such as nonspecial shape should be handled after then.

Furthermore, doing the production of this project, my teammates cooperate well with me. Therefore, we can finish this project successfully. If I have a chance, I will be glad to work with them again.

Reference

https://www.mathsisfun.com/algebra/trig-area-triangle-without-right-angle.html