An Engaging and Enriching Process of Discovery

The following is the full speech delivered by the Guest of Honour, Ms Ho Peng, Director-General of Education, at the Singapore Mathematical Society Annual Prize Presentation Ceremony 2012 on September 1, 2012, at the NUS High School of Mathematics and Science.

I am pleased to be here with you this morning for the Singapore Mathematical Society Annual Prize Presentation Ceremony. This ceremony is a culmination of a busy period of mathematics activities and competitions by the Singapore Mathematical Society or the SMS for short. It is also an occasion to honour the prize winners of the 2012 Singapore Mathematical Olympiad, the Singapore Mathematics Project Festival as well as the 53rd International Mathematical Olympiad.

About 10,000 students participated in this year's Singapore Mathematical Olympiad and Project Festival. It is heartening to see the strong interest in mathematics and mathematics competitions among students, teachers and schools. Credit must be given to the SMS for keeping the calendar of Mathematics-related activities and competitions in Singapore exciting every year.

Mathematics competitions and activities offer an enriched curriculum beyond the classroom, and provide a challenging platform for students like you to hone your skills and demonstrate your abilities. From the preparation and training to the performance on the competition day, from the intensity of solving the problems on your own to the lively discussions of your solutions with friends and the realisation of blind spots that caused you to stump over the questions, there is much to be gained by everyone - new strategies, more knowledge, a quicker mind, new friends, and many more. I am sure the Singapore team to the International Mathematical Olympiad especially can relate to what I have just described.

The team which represented Singapore gave a strong performance at the 53rd International Mathematical Olympiad held in Argentina in July this year. The members comprise Ang Yan Sheng, Lim Jeck, Ling Yan Hao, Lawrence Li, Lee You Jun and Ryan Kor. With one Gold, three Silver and two Bronze medals, the Singapore team came in 7th out of 100 participating countries. Lim Jeck added the icing on the cake by being the only contestant, and also the first Singaporean, with a perfect score at the Olympiad. We have certainly come a long way since Singapore first participated in the Olympiad in 1988. Well done!

I would also like to thank the dedicated team of trainers who were instrumental to the team's preparations and achievement. Many of the trainers are also members of the SMS. They have tirelessly volunteered their Saturdays to teach, coach and mentor the students out of their passion for Mathematics as well as their dedication to helping these young talents realise their potential and dreams. In fact, trainers like Associate Professor Tay Tiong Seng and Associate Professor Wong Yan Loi from NUS are stalwarts - having been involved in the Olympiad training for more than a decade, and never failing to arouse students' interest in creative and challenging mathematical problem solving.

For all of you here, the Mathematics Olympiads, projects and contests define only one stage of your learning of mathematics. I am certain that you have each benefitted from the experience and challenge. I hope that you would continue to deepen your understanding and appreciation of the subject and I would like to suggest three things for you to take away. Coincidentally, they form the acronym "SMS".

Firstly, **stamina**. Let me explain what I mean by that. Take the proof of Fermat's Last Theorem, for instance. It certainly was not derived overnight. In fact, it was thought of as one of those notorious unsolved mathematical problems that have eluded many prominent mathematicians for centuries. In 1995, the mathematics community finally accepted the proof of Fermat's Last Theorem by Andrew Wiles. A mathematician, Wiles had dedicated many years of his career and life to finding a proof. Fermat was a childhood passion for Wiles, and in the journey to construct the proof, Wiles experienced many ups and downs, including self-doubt. It took stamina and strength of will for him to stay focused on the problem, continually thinking and re-thinking, but never giving up. Mathematicians like Wiles are a source of inspiration to all of us not only for their brilliance, but also for their stamina in the pursuit of their goals and dreams.

Secondly, **mathematical tools**. Some of you are just beginning to fill your bag of mathematical tools. For others, you may have already accumulated a huge bag of tried-and-tested tools. All mathematicians have a variety of mathematical tools which they use for solving problems. These include known results and theorems, strategies and heuristics, methods of proofs and reasoning, just to name a few. The tools form a critical part of any mathematician's arsenal to attack new problems or solve old ones from new angles. As you continue to challenge yourself with different problems of varying levels of difficulty, your tools will gradually grow in sophistication, precision and reliability. These tools will come in handy when you pursue your further studies in mathematics or in other disciplines.

Finally, **share**. Even though there are mathematicians who achieve breakthroughs through their own efforts, many of them produce new results by building on the work of other mathematicians as well. I encourage you to share your ideas, discuss the interesting way to solve a problem that you discovered, or simply talk about mathematics with your friends and teachers. Navigating a problem and gaining insight into a problem is more satisfying and fun when you do it with like-minded people. I hope you will have opportunities to see Mathematics as a process of discovery which becomes more engaging and enriching when you embark on it both individually and with friends.

The SMS has done an excellent job in creating a community of students, educators and mathematicians with a shared interest in mathematics. I am confident that we can continue to count on their support to keep the community vibrant. I shall take this opportunity to challenge members of the Society present to consider how they could, through their activities, encourage more students to take up careers in mathematics, the sciences and engineering. Careers in Science, Technology, Engineering and Mathematics are growing in demand. We need people with expertise in these areas to keep Singapore competitive and relevant.

In closing, I would like to extend my congratulations to all the winners here today on your achievements. While the Olympiads and the Project Festival attract and showcase different talents, what is common is that they encourage students with an inclination or passion for mathematics to deepen their learning of mathematics. In particular, I hope that your participation in the competitions has provided you with the encouragement to continue to scale new heights in mathematics, or branch into research, the sciences or engineering where mathematics is key to understanding and success.