▲ Put on Your "Mathematical Glasses": Connecting *The Simpsons*® and Mathematics

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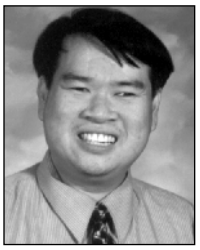

Louis Lim is department head of mathematics at Unionville HS and a PhD student at York University. He is currently an editorial panel member of the NCTM's Mathematics Teacher*. In 2003, Louis was the recipient of the York University Faculty of Education Alumni Association's* Excellence in Teaching Award*. He continues to find innovative and creative ways to make mathematics fun for his students.*

For years, Ron Lancaster has created Math Trails for his students[1]. Workshops have been offered at past OAME conferences where Ron would take conference delegates, often accompanied by his own students, on guided walks. In recent issues of his PhotoMath column in the *Ontario Mathematics Gazette*, mathematics has been captured in buildings, signs, sculptures, and sidewalk mosaics. I am convinced, when we put on "mathematical glasses", we can find mathematics all around us.

As a regular viewer of the popular animated television show, *The Simpsons*®, I have continually been surprised with the numerous mathematical references made. To my delight, Professors Sarah Greenwald (Appalachian State University) and Andrew Nestler (Santa Monica College) wrote an article in the April 2003 issue of the Mathematical Association of America (MAA)'s *Math Horizons* titled, "Simpsons Rule!" In fact, the authors have created a web site, www.simpsonsmath.com, which currently contains 23 printed pages of scenes from *The Simpsons*®, where mathematics makes an appearance. Greenwald and Nestler state that there is no accident that mathematics appears on the television show since several writers have university degrees in mathematics from Harvard. During the past several years, I have kept a pencil and notepad close by so I could jot down scenes that contain mathematics. I knew there was something special about watching that television show!

In this article, I highlight several instances where I have used scenes from *The Simpsons*® in my mathematics teaching. As a classroom teacher, I am aware that *The Simpsons*® may not be considered the most ideal program for students to watch, although it has been argued on CBC radio that it is the best television show ever[2]. Currently in its 15th year on television stations such as Global and the CBC, we must accept that students watch the program, even though the original audience was intended for adults[3]. As a result, we need to teach students how to critically analyze the effects of various forms of media, on equity, for example. Such a skill is important since we do not want students to take everything at face value.

Emphasis in the new mathematics curriculum has been placed on how to introduce concepts to students. The graphing calculator and the *Geometer's Sketchpad* have opened the doors for exploration so that students are actively engaged in discovering concepts, which should lead to better comprehension and retention. Should emphasis also be given to lesson closures?

My favourite scene occurs when Homer finds a pair of glasses, which actually belong to Henry Kissinger, in the toilet[4]. When Homer puts on the glasses, he says, "The sum of the square roots of any two sides of an isosceles triangle is equal to the square root of the remaining side," only to be corrected by the man in the next washroom stall, "That's a right triangle, you idiot!" When providing closure to the Pythagorean Theorem unit, my

[1] See Ron Lancaster's article, "Math Trails – An Award Winning Method for Connecting Mathematics with the World Around Us" in the December 1998 issue of the Ontario Mathematics Gazette*.*

[2] Speaking with Ron Lancaster, he recalls hearing this remark on the CBC radio.

[3] In the fall 2003, a "Simpsons Extravaganza" took place at the Metro Convention Centre in Toronto. Thousands of Simpsons® fans, including many young families, enjoyed the display of original drawings, sketches, and production cels.

[4] I am the proud owner of an original production cel of this scene! My cel is unique since each movement of a character requires a separate cel.

students identify the **three** mistakes in Homer's description. We also discuss the appropriateness of the remark "you idiot" since I do not want students calling each other derogatory names.[5] Homer has certainly found a pair of "mathematical glasses", even if they are a bit crooked!

When teaching a lesson on derivatives in calculus, I include the scene with Bart Simpson's grade 4 teacher using differential calculus in a humorous manner: "So, $y = \frac{r^3}{3}$, and if you determine the rate of change in this curve correctly, I think you'll be pleasantly surprised … Derivative $dy = \frac{3r^2}{3} dr$, or r^2dr, or r dr r. Har de har har! Get it?" All my calculus classes have chuckled at this scene. In fact, former students would often state this experience to be a memorable moment of the course! I think it is important, especially in calculus, to include humour, since the learning environment is often marks-driven.

When discussing irrational numbers, I use a scene with two girls playing a game by reciting the digits of π: "Cross my heart and hope to die. Here's the digits that make π: 3.141 592 653 589 793 238 4 …" After reading the www.simpsonsmath.com web site, I became enthused to learn that the camera deliberately moved away from the children's game since, by reciting the digits of π, the game would theoretically never end! Perhaps this analogy will help students remember irrational numbers.

One final scene that has impacted my mathematics teaching is Homer entering the 3rd dimension. According to Greenwald and Nestler, the scene lasted 7.5 minutes! I remember writing the equations in the background on my note pad: "1 + 1 = 2", "$e^{\pi i} = -1$" and "$1782^{12} + 1841^{12} = 1922^{12}$". In particular, I found $1782^{12} + 1841^{12} = 1922^{12}$ very interesting since I knew, according to Fermat's Last Theorem, that the equation could not be true. Students are fascinated that this 350-year-old problem was solved only a decade ago by Andrew Wiles. I tell students that Wiles learned of Fermat's Last Theorem[6] when he was 10 years old and spent many years before he proved that there are no solutions to $x^n + y^n = z^n$, n > 2, and x, y, and z are positive integers. I also emphasize that solving mathematical problems can take hours, days, months, years, and even decades; perseverance and determination are key factors.

http://xo.typepad.com/blog/2003/12/fullscale_simps.html

Recently, a grade 12 calculus student brought to my attention to the "Simpsons House Giveaway", a contest that 15 million people entered in 1997. The prize, a full-scaled replica (both inside and outside) of the four-bedroom house, can be viewed using an Internet search engine by typing in "Simpsons" + "house". Such a discussion should enthuse my future grade 10 applied mathematics students when they learn about scale-drawings.

In this article, I have provided four instances where I have used *The Simpsons*®, with great success, in my teaching. I encourage readers to visit www.simpsonsmath.com since many more mathematical scenes are discussed, which also contain animated photos! The past half a decade has been very challenging for teachers, with the implementation of new curriculum, instructional and assessment practices. It is time to reflect and refine our practices. One way to make the learning environment non-intimidating is through the use of humour. Although some teachers may be hesitant to use *The Simpsons*® in their teaching, I would argue that since some students are already watching the television show, we could teach them how to critically analyze the program. Several years ago, I recall asking a student in the hallway, "Do you have a lot of homework tonight?" His response, "No … I'm going to spend the evening watching *The Simpsons*®." If a student provided a similar response today, I would say, "Remember to put on your 'mathematical glasses'!" As the show is currently in its 15th season, I wonder what mathematical surprises await us! ▲

[5] I would like to acknowledge the feedback provided by the blind reviewers in my original manuscript. Their concerns about equity have strengthened my article.

[6] A readable book for senior level high school students interested in learning more about Fermat's Last Theorem is Simon Singh's Fermat's Enigma*, published by Penguin Books.*