Simpsons Rule!

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All photos courtesy Fox Home Entertainment & *The Simpsons* Season One DVD Collection.

Now in its 14th season, *The Simpsons* is an award-winning global pop culture phenomenon and the longest-running sitcom in television history. Did you know that *The Simpsons* also contains scores of instances of mathematics, many designed to expose and poke fun at innumeracy? Several episodes of *The Simpsons* contain significant mathematics, with material ranging from arithmetic to geometry to calculus. There's even a resident mathematician and inventor, Professor Frink.

> Al Jean, Executive Producer and head writer of *The Simpsons*, has a bachelor's degree in mathematics from Harvard University.

Here we present some of our favorite mathematics from the series. You can check out our extensive guide to this subject online (`http://simpsons math.com`). We hope that you enjoy these memorable mathematical moments from *The Simpsons*, and along with us, keep your eye out for still more in the years to come.

Geometry and Topology

In the episode "$pringfield (Or, How I Learned to Stop Worrying and Love Legalized Gambling)," a take-off on the subtitle of *Dr. Strangelove*, Homer finds a pair of eyeglasses in a men's room toilet, and upon putting them on, recites what he presumably believes to be the Pythagorean Theorem. [Actually, borrowing again from a great movie, he recites, verbatim, what the Scarecrow says in the film *The Wizard of Oz* upon receiving his "brain."]

> **Homer:** The sum of the square roots of any two sides of an isosceles triangle is equal to the square root of the remaining side.
> **Man in stall:** That's a right triangle, you idiot!
> **Homer:** D'oh!

In the segment "Homer³" of the 6th annual Halloween episode "Treehouse Of Horror VI," Homer disappears into a wall in the living room, and his family and friends gather to try to rescue him.

> **Lisa:** Well, where's my dad?
> **Professor Frink:** Well, it should be obvious to even the most dimwitted individual who holds an advanced degree in hyperbolic topology, n'gee, that Homer Simpson has stumbled into the third dimension….
> **Frink:** [drawing on a blackboard] Here is an ordinary square....

> Matt Groening, creator of *The Simpsons*, grew up in Portland, Oregon, with a father named Homer, a mother named Marge and sisters named Maggie and Lisa.

> **Police Chief Wiggum:** Whoa, whoa—slow down, egghead!
> **Frink:** ...but suppose we extend the square beyond the two dimensions of our universe, along the hypothetical *z*-axis, there.
> **Everyone:** [gasps]
> **Frink:** This forms a three-dimensional object known as a "cube," or a "Frinkahedron" in honor of its discoverer, n'hey, n'hey.
> **Homer's voice:** Help me! Are you helping me, or are you going on and on?
> **Frink:** Oh, right. And, of course, within, we find the doomed individual.

Here the characters appear to be assuming that their world is two-dimensional; later in the same episode they behave as if it were three-dimensional.

Arithmetic and Number Theory

One of the equations rushing past Homer in his strange 3rd dimension is

$$1782^{12} + 1841^{12} = 1922^{12}.$$

This equation is false. Yet, some of our students think it is true since a TI-83 gives the 12th root of the left-hand side as 1922!

Don't you get it, Bart? Derivative $dy = 3r^2\, dr/3$, or $r^2\, dr$, or $r\, dr\, r$. Har de har har! Get it?

David X. Cohen, who served as a writer for *The Simpsons* for almost five years before creating *Futurama*, has a bachelor's degree in physics from Harvard University and a master's degree in computer science from UC Berkeley.

In "Guess Who's Coming To Criticize Dinner?" the children take a field trip to a major newspaper publisher.

> **Newspaper editor:** … And to protect Mother Earth, each copy contains a certain percentage of recycled paper.
> **Lisa:** And what percent is that?
> **Newspaper editor:** Zero. Zero's a percent!

In "Bye Bye Nerdie," Lisa asks Nelson why another bully attacks only nerds.

> **Lisa:** Why does she only go after the smart ones?
> **Nelson:** That's like asking the square root of a million—no one will ever know.

In the same episode Prof. Frink addresses fellow scientists at a conference.

> **Prof. Frink:** Scientists...Scientists, please! I'm looking for some order. Some order, please, with the eyes forward and the hands neatly folded and the paying of attention. π is exactly three!
> [crowd gasps]

> **Frink:** Very sorry that it had to come to that, but now that I have your attention, we have some exciting new research from young Lisa Simpson. Let's bring her out and pay attention.

In the episode "Marge In Chains," Apu and Homer discuss π

> **Apu:** In fact I can recite π to 40,000 places. The last digit is one!
> **Homer:** Mmmm, pie.

If you use a computer algebra program to check this, you will see that Apu is correct.

Calculus

In "Bart The Genius," fourth-grader Bart cheats on an aptitude test, and is subsequently transferred to a school for gifted children.

> **Teacher:** So $y = r^3/3$ and if you determine the rate of change in this curve correctly, I think you'll be pleasantly surprised.
> [The class laughs.]
> **Teacher:** Don't you get it, Bart? Derivative $dy = 3r^2\, dr/3$, or $r^2\, dr$, or $r\, dr\, r$. Har de har har! Get it?

Probability

In "Dog Of Death," a TV ad for the state lottery is shown, featuring office workers in a skyscraper.

> **Employee:** I don't need your crummy job, Mr. Employer! I've won the lottery!
> **Employer:** Well, who needs employees? I won the lottery, too!
> [Two window washers descend on a scaffold, each with a huge bag of cash at his feet]
> **Window washers:** We both won the lottery!
> **All [to camera]:** Why don't you win the lottery, too!
> **Announcer:** The state lottery—where everybody wins! (Actual odds of winning: 1 in 380,000,000.)

Of course, we estimate your odds of laughing along with a mathematical moment on *The Simpsons* to be much higher than that! ■