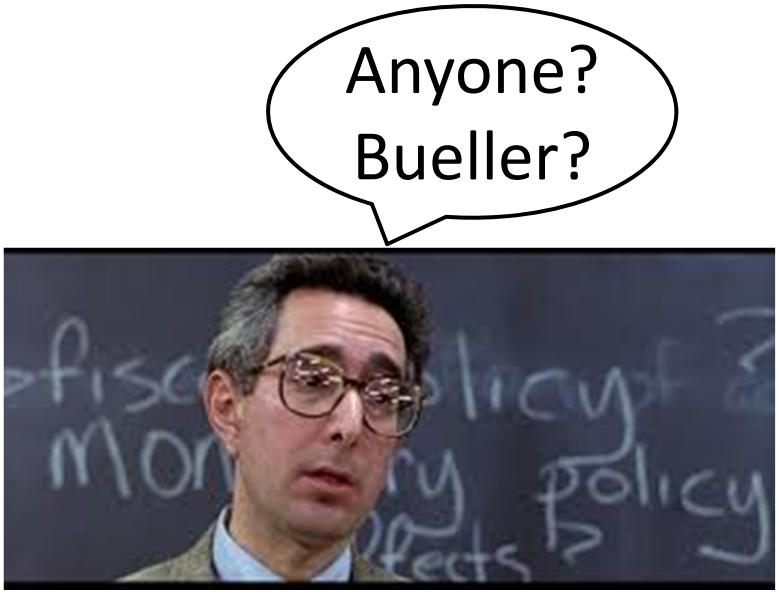
Spicing Up the Bland

Engaging Students While Covering
Less Than Fascinating Mathematics

David Medd, 2012

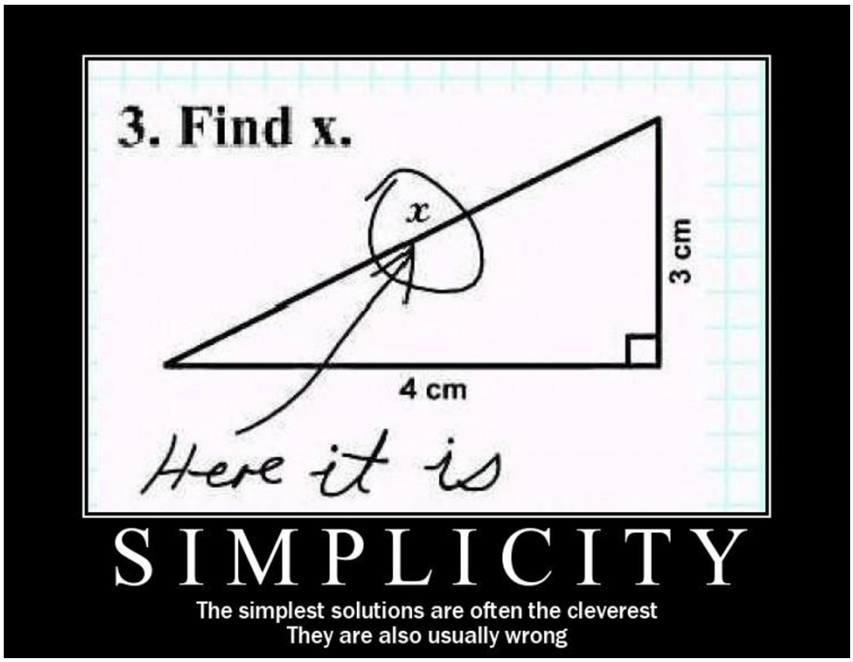


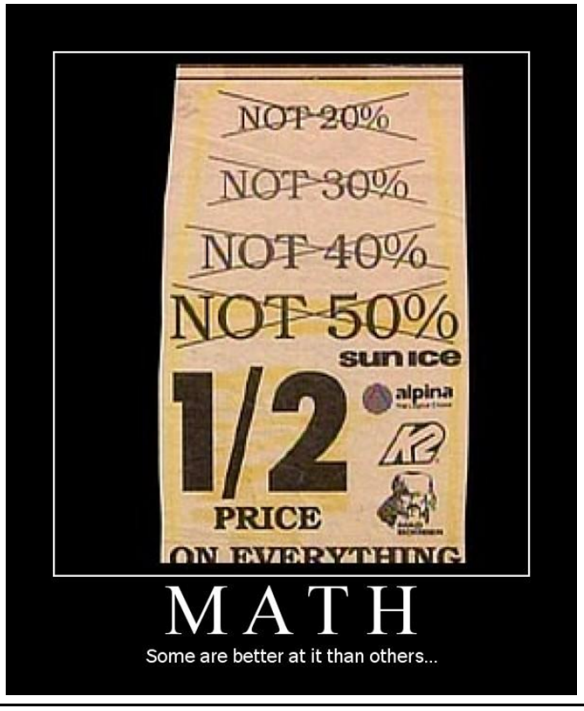
Methods to Mention

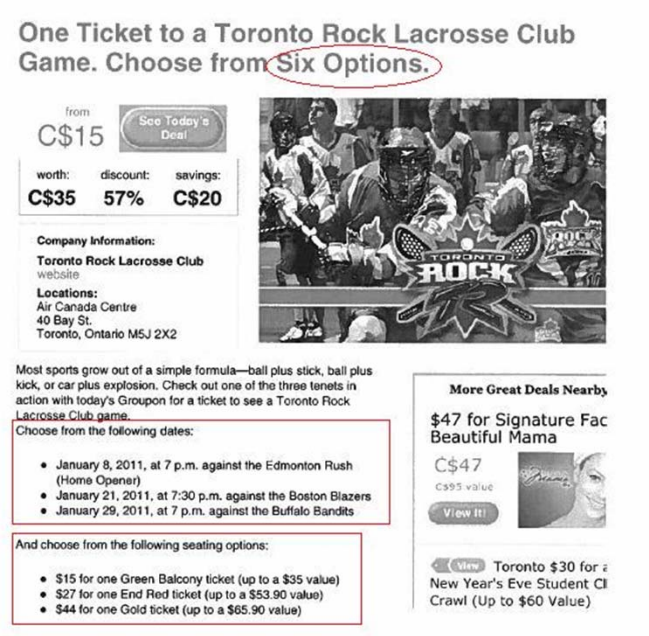
- Humour
- Tangents (no, not those tangents)
- Other Academic Topics
- Pop culture & Student's world

Humour

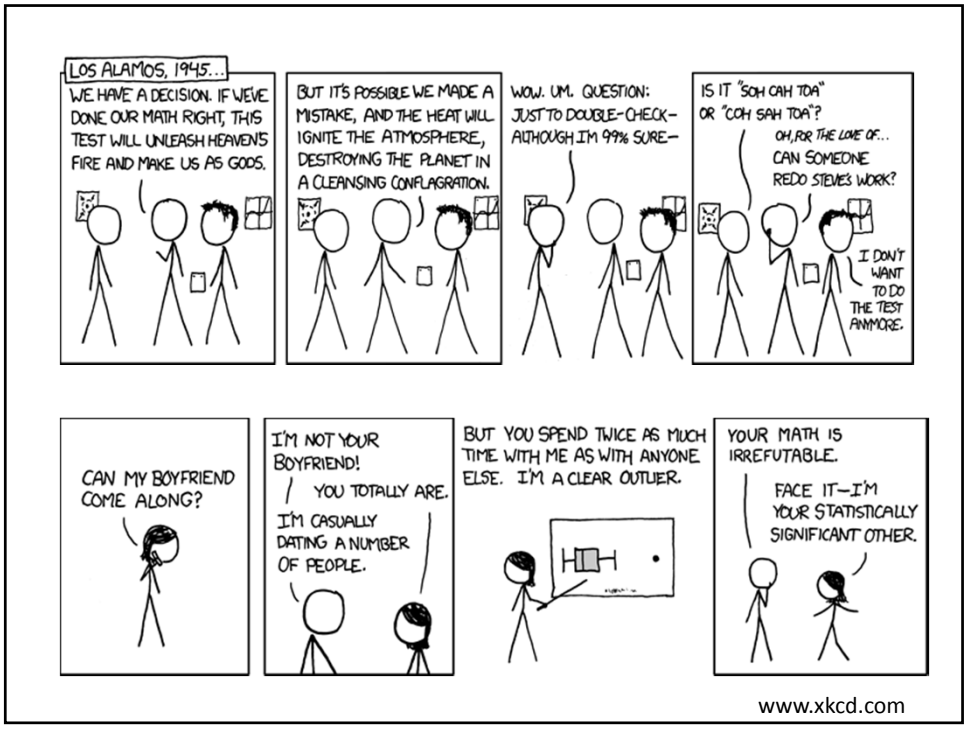
- There is considerable research & opinion
- Positive learning environment, catalyst to mix instructor enthusiasm with student engagement
  - "Steal" from students
- Classroom management tool
- Success levels in "dread courses" (math!)
- Enough academic fluff, get to the funny stuff...
  - PPT on "origin of numbers"


3. Find x.
x
3 cm
4 cm
Here it is
SIMPLICITY
The simplest solutions are often the cleverest
They are also usually wrong

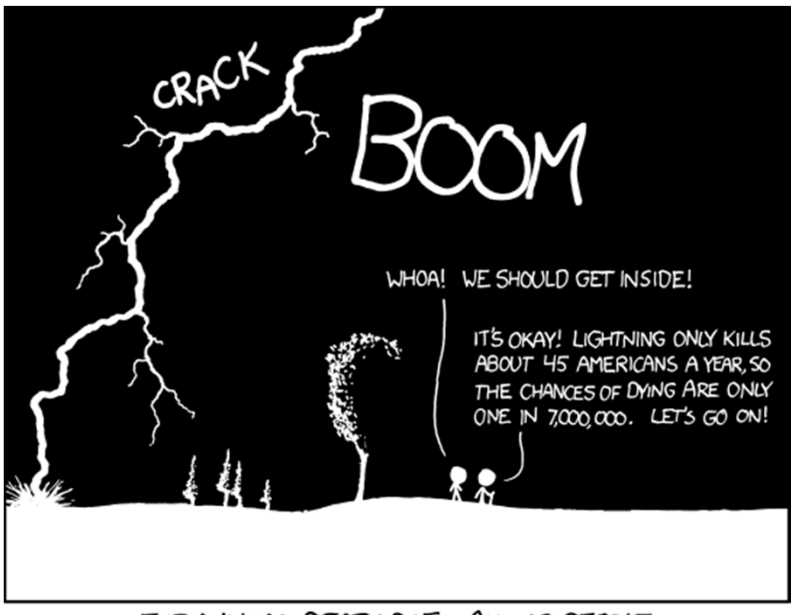

NOT 20%
NOT 30%
NOT 40%
NOT 50%
sun ice
alpina
1/2
PRICE
ON EVERYTHING
MATH
Some are better at it than others...



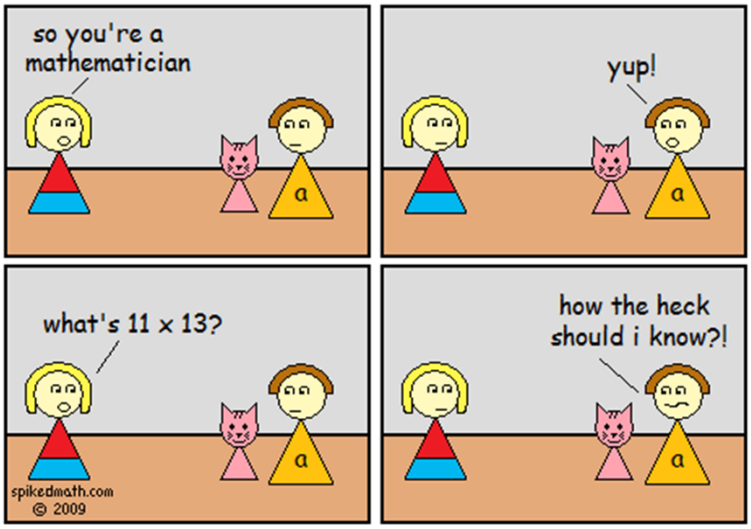
And the next day...

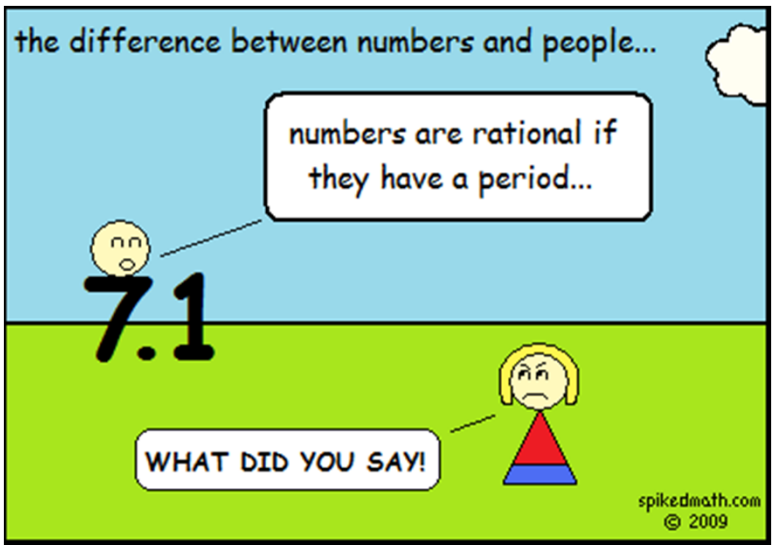


www.xkcd.com



THE ANNUAL DEATH RATE AMONG PEOPLE WHO KNOW THAT STATISTIC IS ONE IN SIX.


so you're a mathematician
yup!
what's 11 x 13?
how the heck should i know?!
a
spikedmath.com
© 2009


the difference between numbers and people...
numbers are rational if they have a period...
7.1
WHAT DID YOU SAY!
spikedmath.com
© 2009

Tangents

- Take the time to say something interesting when it's topical.
- Yes, it may go over some heads, but others may appreciate it a good deal. And only takes moments.
- Good fodder for bonus test questions: encourages paying attention

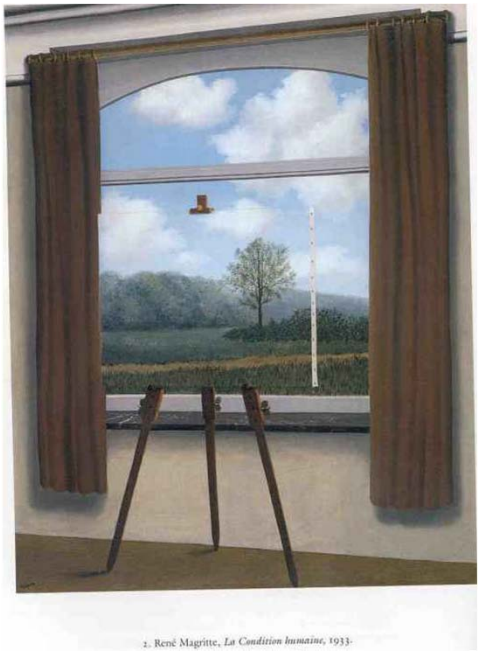
Tangents – Some Examples

- Exponents: 5^0 (why?), 0^0, Results vs. Rules
- $\frac{0}{0}$ What's it's value? Why 5/0 is undefined?
- Levels of infinity in set theory: "It can be shown that..."
- Is cancelling a mathematical operation? Cross multiplying?
- Exponents/Scie $\frac{2x}{2x+1} = \frac{1}{1+1} = \frac{1}{2}$

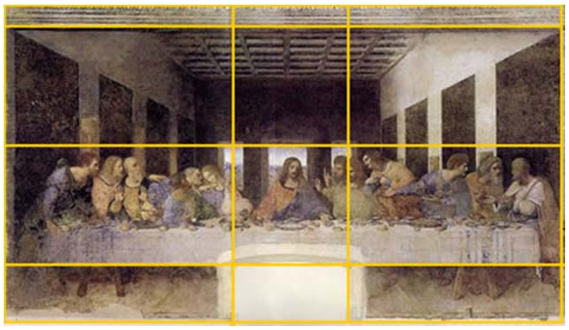
"The Sand $\frac{\sqrt{3}}{3} = \sqrt{}$

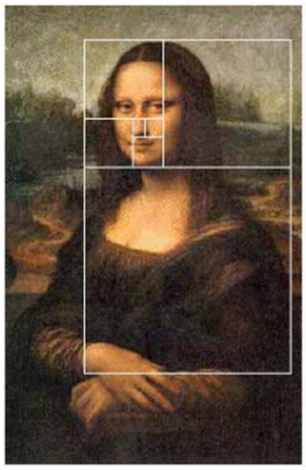
Other Academic Topics

- The Sand Reckoner: Philosophy
- Other: logic, self reference, computation & limits
- Computer Science: Object Oriented Programming, program for Prisoner's Dilemma
- English: Poe (Gold Bug), Borges, Lewis Carroll, "Riddle of the Universe and It's Solution", "This is Not A Story", "Ceci n'est pas un Pipe", math "everyone" books (Palos, Hofstadter, "Struck By Lightning")
- Art: Magritte, Escher, Fractals, Golden Ratio



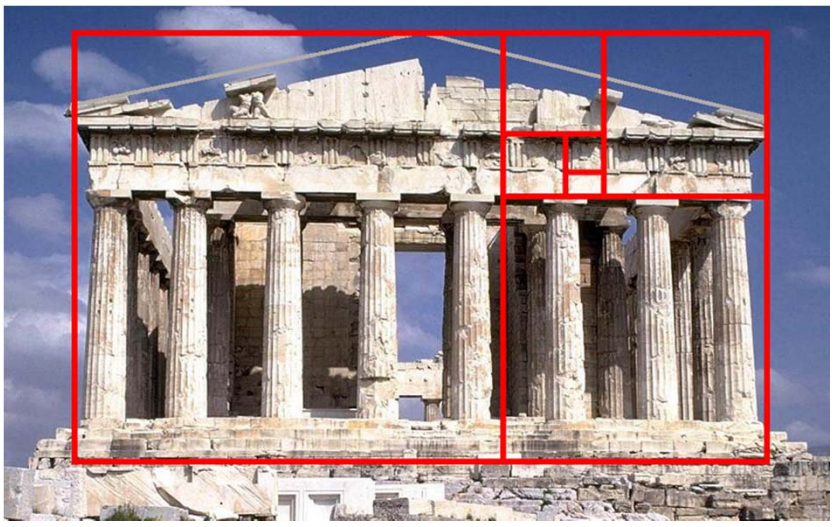
1. René Magritte, *La Condition humaine*, 1933.



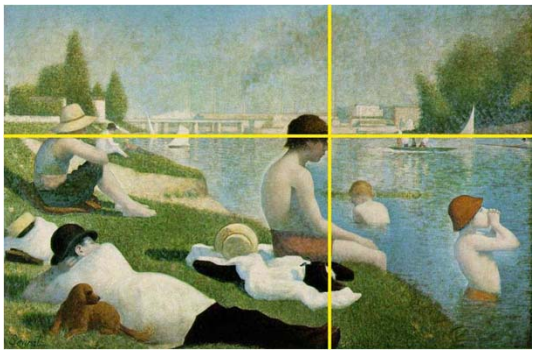


Golden Ratio Images

Following images courtesy Jill Glessing, York University, from “Formula for Beauty” presentation for Ontario Science Centre’s *Café Scientifique*.



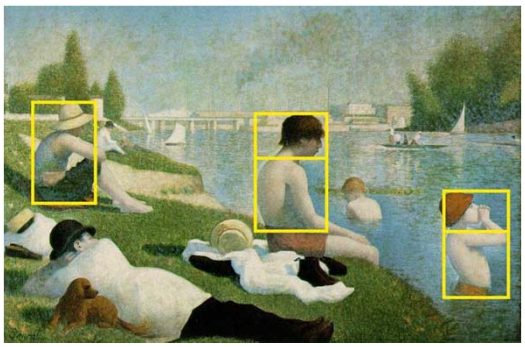
Golden Ratio Image, courtesy Jill Lessing



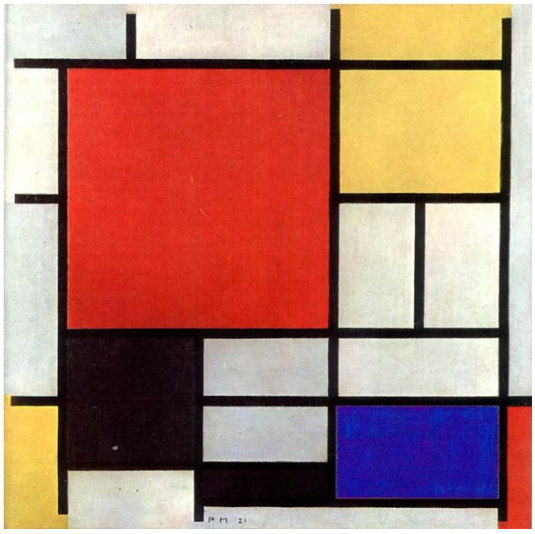
Modern Art

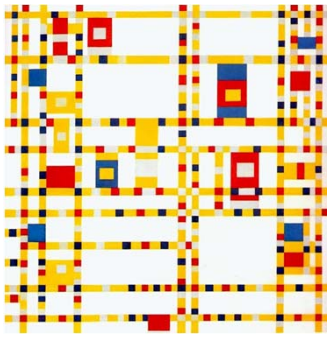
Seurat
“Bathers”
late 1800s

Seurat
"attacked every canvas by the golden section"



Full slide Jill Lessing





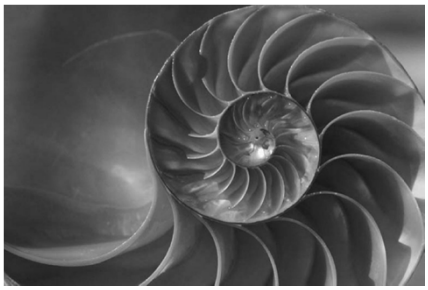
Modernism
Geometric Abstraction
"De Stijl" movement

Mondrian
“Tableau 11”, 1921-5
and
“Broadway Boogie Woogie”, 1942

Full slide Jill Lessing

Natural Sciences: Fibonacci Spiral in Nature
Nautilus Shell, Sunflower Heads, Pinecones…



Full slide Jill Lessing

Rule of thirds

Full slide Jill Lessing

Darwinian Evolutionary Aesthetics

e.g. Denis Dutton

Human beings everywhere find the Savannah landscape among the most beautiful because it shows an ideal land for Pleistocene sustenance.

Full slide Jill Lessing

Pop Culture/Student's World

- Film (Abbott & Costello, Die Hard III, The Simpsons, Proof, Pi, The Cube, Stawdogs, 21)
  - Mathematical Ideas (Pearson) does this well
- Newspaper/web articles: "Driving Stoned Safer than Driving Drunk" (stats abuse)
- Joe DiMaggio's hit streak & rebuttal (stats & simulation; NYT, WSJ)
- Radio: interview after resignation of Chief Statistician at Statistics Canada, Online Polls (CBC)
- Price of calculator? YouTube "Calculator Commercial"

1. "Girls require time and money":

$$\text{girls} = \text{time} \times \text{money}$$

2. "Time is money":

$$\text{time} = \text{money}$$

3. So girls are money squared:

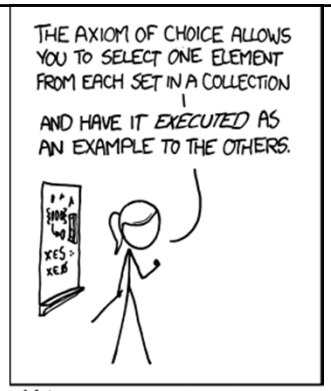
$$\text{girls} = \text{money}^2$$

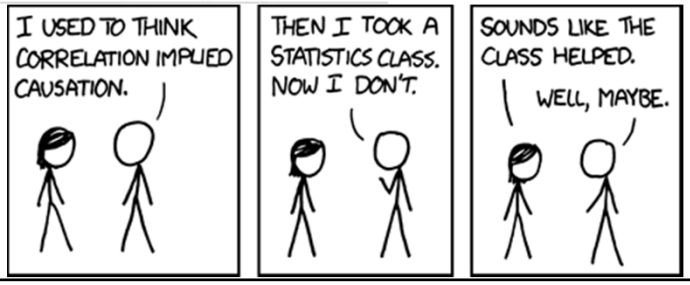
4. "Money is the root of all evil":

$$\text{money} = \sqrt{\text{evil}}$$

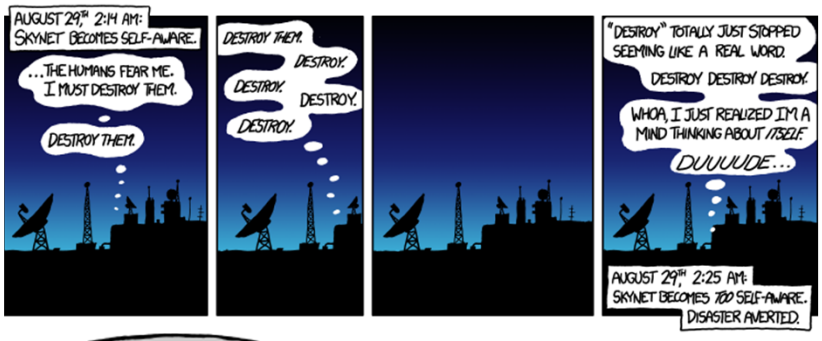
5. So girls are evil:

$$\text{girls} = \left(\sqrt{\text{evil}}\right)^2 = \text{evil}$$





One more slide of funny...



$$\int e^x = f(u)^n$$

Sex is fun