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# Mistakes, Mistakes Everywhere

Keith Nabb  
University of Wisconsin-River Falls  
[keith.nabb@uwrf.edu](mailto:keith.nabb@uwrf.edu)

Math Forward  
Victor Valley Community College District  
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In Food/Drug

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Source: sycmu



# Oreo Double Stuf



Double = 1.86

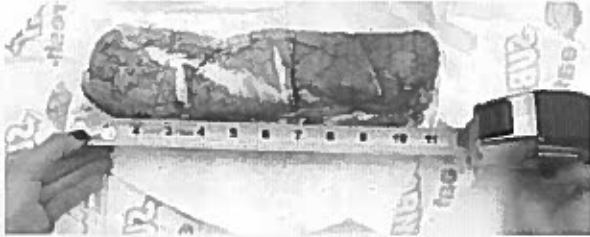
	Original	Double	Mega
10 cookies	115.66g	146.66g	176.48g
1 cookie	11.57g	14.67g	17.65g
Creme (cookie - 2 wafers)	3.61g	6.71g	9.69g
		1.86x stuff	2.68 stuff

5 wafers = 17.92g

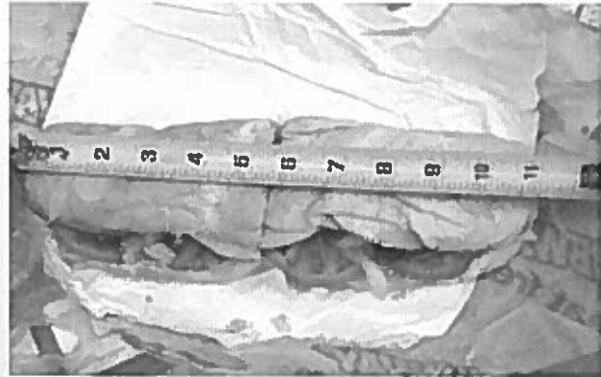
⇒ each wafer = 3.98g

Source: Math teacher Dan Anderson

Is Subway's "Footlong" a foot long?



Source: NY Post



Source: Matt Corby (Australian Subway customer)

Minnesota State Fair



Source: DuetsBlog

How many grams in an ounce?



1 ounce = 28.3495 grams

16 ounces = 453.592 grams

Source: threesixty360.wordpress.com

## McDonald's Quarter Pounder vs. A&W's Third-Pounder (1980s)

- A&W wanted to offer a **bigger** burger for the same cost
- A&W's burger beat McDonald's quarter pounder in blind taste tests
- But Americans would not purchase the third-pounder
- A&W held some focus groups only to find....

More than half of the participants in the Yankelovich focus groups questioned the price of our burger. "Why," they asked, **"should we pay the same amount for a third of a pound of meat as we do for a quarter-pound of meat at McDonald's? You're overcharging us."**

*-Threshold Resistance by Alfred Taubman  
(then owner of A&W)*

Source: *Mental Floss*

## Terra Nova Expedition (1910-1912)

- Robert Falcon Scott estimated 4,500 calories per day for his men.
- Given the toboggans being hauled and the high altitude, we now know this ration is insufficient for the mission.
- Explorers died from exhaustion and starvation.



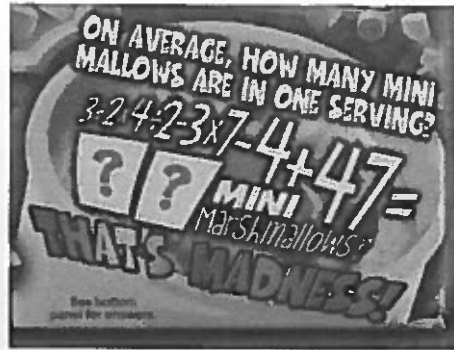
Source: Wikipedia

Source: <http://www.bbc.com/news/magazine-27509559>

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## Swiss Miss Marshmallows (Hot Cocoa Mix) (2010)

How many mini marshmallows are in a serving?

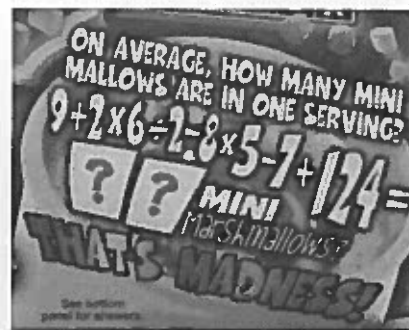
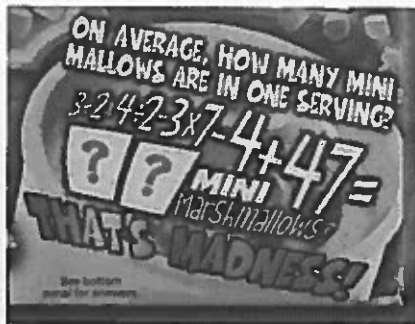


Intended answer: 92 (but if you compute correctly, you'll get 29)

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## Marshmallows

Students at Bay State Middle School (MA) wrote to Swiss Miss. Swiss Miss corrected the error:



Source: Lewis (2015)

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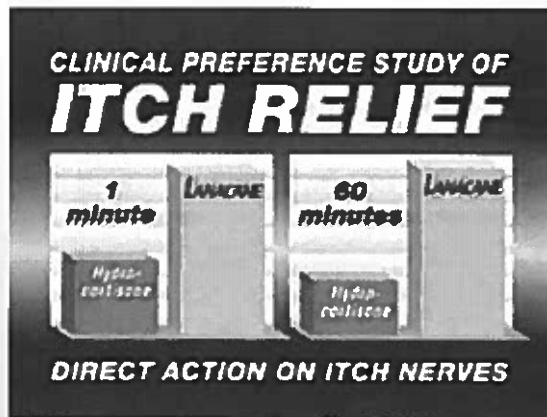
## Nature Valley



Source: London Metro

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## Lanacane



Source: <http://www.statisticshowto.com/misleading-graphs/>



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## In Film/TV

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### Disney's *Zootopia* (2016)

"Prey outnumber predators 10 to 1." -Bellweather

"Prey make up 90% of Zootopia." -Bellweather

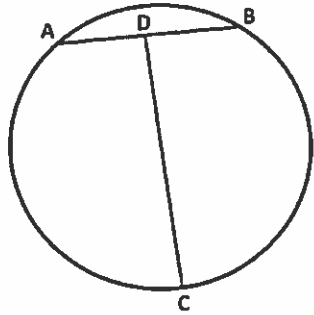


Source: YouTube

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## The Man Without a Face (1993)

"Draw a circle ABC. Draw within it any straight line AB. Now, bisect AB at D and draw a straight line at DC at right angles to AB." –Justin McLeod



Source: Math Mistakes in Movie and TV

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## The Wizard of Oz (1939)

"The sum of the square roots of any two sides of an isosceles triangle is equal to the square root of the remaining side."

-Scarecrow



Source: Warner Home Video

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"The sum of the square roots of any two sides of an isosceles triangle is equal to the square root of the remaining side."



Is it  $\sqrt{a} + \sqrt{a} = \sqrt{b}$ ?

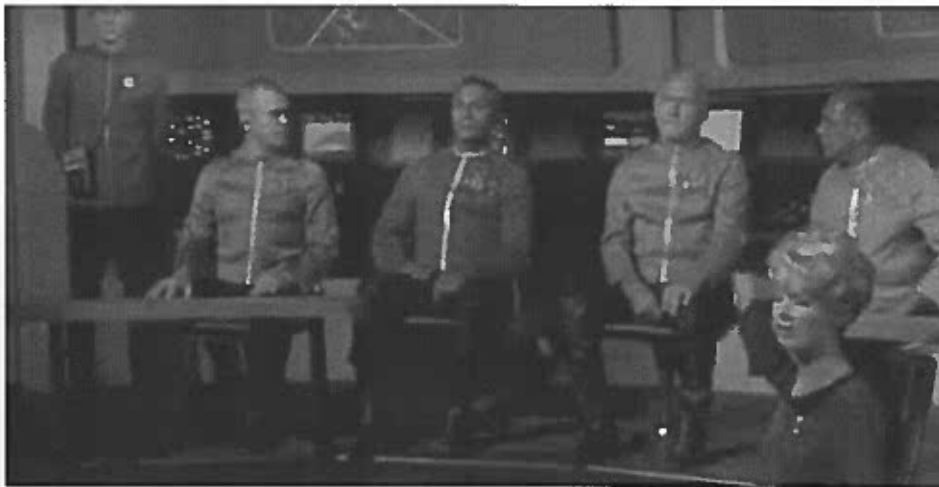
Is it  $\sqrt{a} + \sqrt{b} = \sqrt{a}$ ?

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Star Trek (1967)

[searching for a lost crew member] "Gentlemen, this computer has an auditory sensor. It can, in effect, hear sounds. By installing a booster, we can increase that capability on the order of one to the fourth power." -Captain Kirk



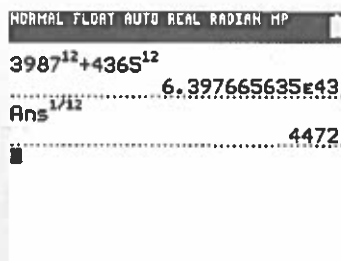
Source: Math Mistakes in Movies and TV; Singh (2013)



Source: Math Mistakes in Movies and TV

## Homer's Last Theorem

$$3,987^{12} + 4,365^{12} = 4,472^{12}$$



Source: Numberphile/You Tube

Message Board: "I know this would seem to disprove Fermat's Last Theorem, but I typed it in my calculator and it worked. What in the world is going on here?"

Source: Singh (2013)



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## Verizon Phone Call

**.002 dollars  $\neq$  .002 cents**



Source: [verizonmath.blogspot.com](http://verizonmath.blogspot.com); Diane Briars (NCTM President, 2014-2016)

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## Parking Tickets (2008)

- Dave Alsop. Entry time **2:49 P.M.**; paid for 75 minutes; covered through **4:04 P.M.**
- **Traffic Warden Math:**

$$14.49 + 0.75 = 15.24$$

**Conclusion: The ticket expires at 3:24 P.M.**

- Dave returns to his car at 3:41 P.M. and finds a £50 fine.

Source: Lewis (2015)

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## California Water Bill (2007)

- Parlier, California
- 2007: City Council approves a 90% increase in water fees
- 2012: An error is discovered

**Interim City Manager Shun Patlan said,  
“One of the staff members inputted the  
decimal point in the wrong place.”**

Source: <http://abc7.com/archive/9205145/>

Source: Lewis (2015)

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## In Media/Social Media

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Toronto Sun



Source: Pinterest

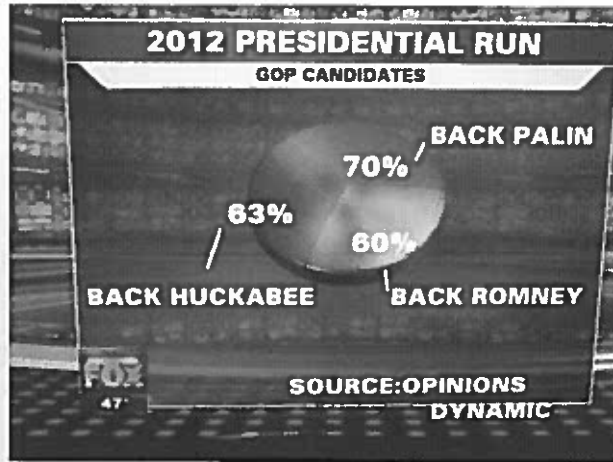
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Welfare, Anyone?



Source: MediaMatters; <http://www.statisticshowto.com/misleading-graphs/>



## Fox News Chicago (2012)

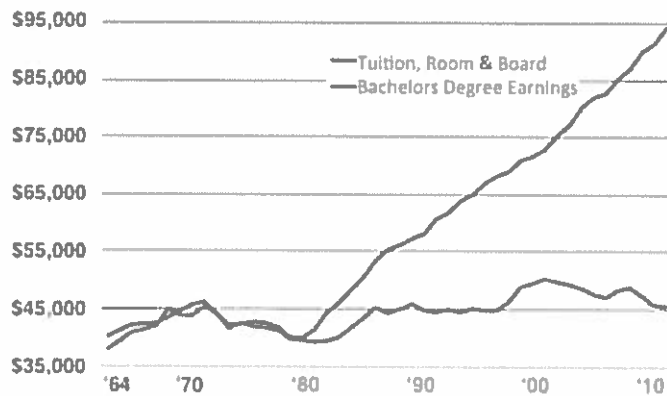


Source: [flowingdata.com](http://flowingdata.com)

## College is not worth the money!

### The diminishing financial return of higher education

Costs of 4-yr degree vs. earnings of 4-yr degree



Source: U.S. Census Data & NCES Table 345

Notes: All figures have been adjusted to 2010 dollars using the Consumer Price Index from the BLS

1. "Costs" of not attending college are even more dramatic.
2. Bachelors Degree Earnings = An annual salary.

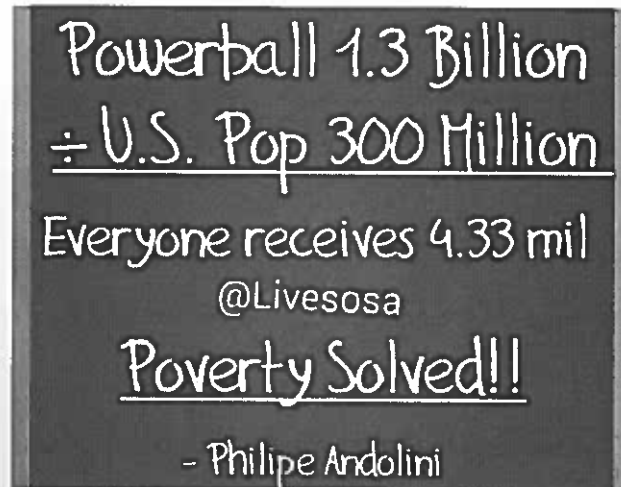
Source: Business Insider;  
<http://www.statisticshowto.com/misleading-graphs/>

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Don't do math in Kentucky!



Source: Kentucky NBC affiliate

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Facebook (2016)



Source: NBC Connecticut

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Powerball 1.3 Billion  
 $\div$  U.S. Pop 300 Million  
Everyone receives 4.33 USD.  
Breakfast Solved!!  
- Do The Math

Source: Facebook



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In Government

## House Bill No. 246 "Indiana Pi Bill" (1897)

- Contained Physician Edwin Goodwin's "solution" to squaring the circle (squaring the circle was proved impossible in 1882)
- "...the ratio of the diameter and circumference is as five-fourths to four."

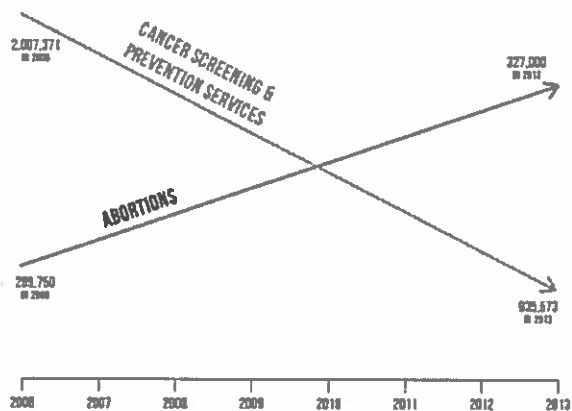
$$\pi = \frac{\text{circumference}}{\text{diameter}} = \frac{4}{5/4} = 3.2$$

- Introduced to Indiana House of Representatives, passed on to the Financial Committee, transferred to the Committee on Swamplands, passed on Feb 6, 1897.
- Senate is ready to ratify; Mathematician C.A. Waldo (Purdue University) comes to the rescue.

Source: Singh (2013);

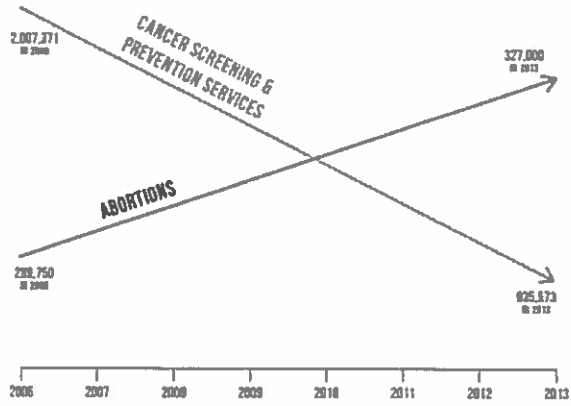
[agecon.purdue.edu/crd/Localgov/Second%20Level%20pages/indiana\\_pi\\_bill.htm](http://agecon.purdue.edu/crd/Localgov/Second%20Level%20pages/indiana_pi_bill.htm)

### PLANNED PARENTHOOD FEDERATION OF AMERICA: ABORTIONS UP – LIFE-SAVING PROCEDURES DOWN



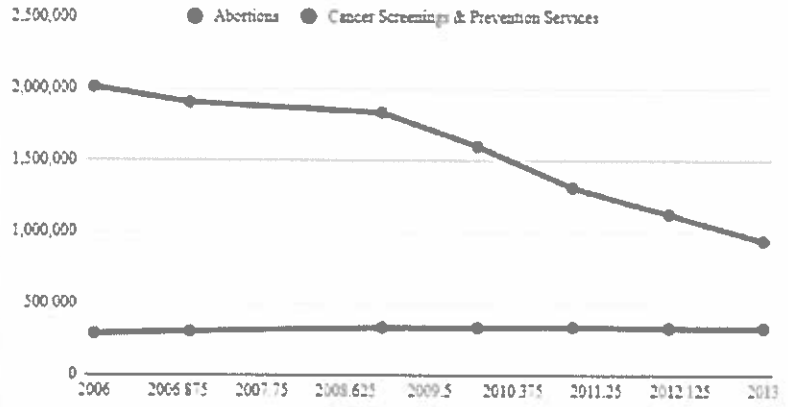
SOURCE: AMERICANS UNITED FOR LIFE

**PLANNED PARENTHOOD FEDERATION OF AMERICA:  
ABORTIONS UP — LIFE-SAVING PROCEDURES DOWN**



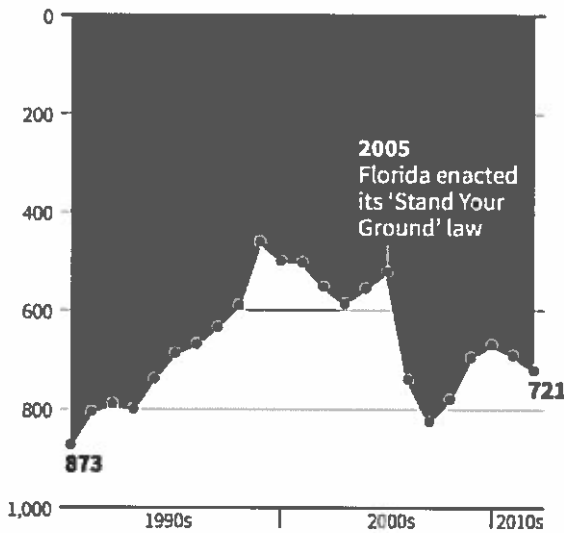
SOURCE: AMERICANS UNITED FOR LIFE

**Planned Parenthood Federation of America: Abortions vs. Cancer and Prevention Services**



**Gun deaths in Florida**

Number of murders committed using firearms



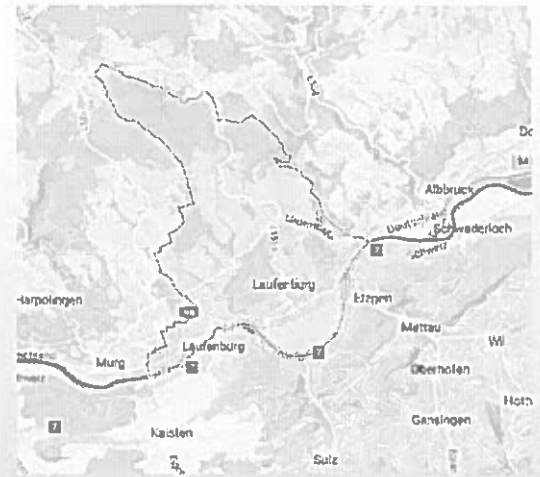
Source: Florida Department of Law Enforcement

Source:  
<https://www.livescience.com/45083-misleading-gun-death-chart.html>



## The stereotypical "Building a Bridge" (2003)

- Laufenburg Bridge across the Rhine River
- Different countries use different reference points for "sea level."
  - Germany uses the North Sea
  - Switzerland uses the Mediterranean Sea
  - A difference of 27 cm
- This was carefully considered when building the bridge to ensure a proper connection over the Rhine.
- However, one side ended up quite a bit higher than the other...**What happened?**



Source: Lewis (2015); <http://www.bbc.com/news/magazine-27509559>; Google maps

## Instead of canceling out the difference, it was **doubled**.

- The German side was 54 cm higher than the Swiss side.
- The German side was eventually lowered to complete the project.

Source: Lewis (2015); <http://www.bbc.com/news/magazine-27509559>

## Mars Climate Orbiter (1998-1999)

- Purpose: An interplanetary weather satellite for Mars (\$125 M)
- NASA was using the metric system but contracting some of the work to Lockheed Martin Astronautics (some of the code used English units)
- Modeling the trajectory of the orbiter
  - Data was supposed to be in Newton-seconds (not pound-seconds)
  - Error propagation in the trajectory
- Calculations had the orbiter remaining at least 226 km above Mars (had to remain at least 80 km above Mars to stay in orbit).
- Reality: The orbiter entered at 57 km above the surface
- Did it burn up? Continue into space?

Source: Lewis (2015)

## Vasa Warship (1628)

- Tragically sank on its maiden voyage (30 died)
- Brought to the surface in 1961
  - Found to be far thicker on one side of the warship
  - **Suspicion:** Using different measurement systems
- Swedish foot = 12 inches
- Dutch foot = 11 inches
- Both workmen assembled/built the ship
- No consensus for measures of stability, stiffness, etc.



Source: BBC

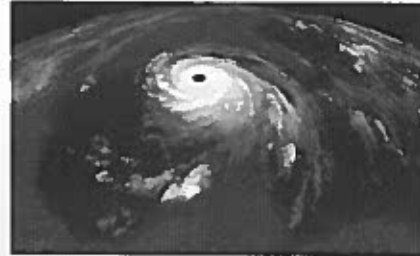
Source: <http://www.bbc.com/news/magazine-27509559>



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## Hurricanes Katrina and Rita (2005)

- (2008) Many donations still never distributed.
- Estimated value of goods: \$85 M
- True value: \$18.5 M
- **Why the error?**



Source: Lewis (2015)

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## Units

- 1 spork was counted as a case of 1000
  - \$36,000,000  $\neq$  \$36,000
- 1 roll of toilet paper was counted as a package of toilet paper
  - \$1,500,000  $\neq$  \$18,000

Source: Lewis (2015);  
<http://www.cnn.com/2008/US/07/21/katrina.supplies/index.html?iref=topnews>



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## How did this happen?

- Canada was undergoing metrication (mid 1970s)
- **Old:** gallons, pounds    **New:** liters, kilograms
- Boeing 767 used **kg** for fuel loads (not **lbs**)
- **THE MATH (VOLUME TO WEIGHT CALCULATION)**

$$7,682 \text{ L} \times 1.77 = 13,597 \text{ kg}$$

$$8,703 \text{ kg} \div 1.77 = 4916 \text{ L} \quad \boxed{5,000 \text{ L}}$$

$$7,682 \text{ L} + 5,000 \text{ L} = 12,682 \text{ L}$$

1.77 is the conversion factor from L to lbs (not L to kg). Reality: the 12,682 L  $\neq$  22,447 kg but actually 22,447 lbs (around 10,200 kg)

Source: Lewis (2015)



Source: Winnipeg Free Press

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**Keith Nabb**

**University of Wisconsin-River Falls**

**Department of Mathematics**

**[keith.nabb@uwrf.edu](mailto:keith.nabb@uwrf.edu)**

