

Using the Media to Learn Mathematics

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Project

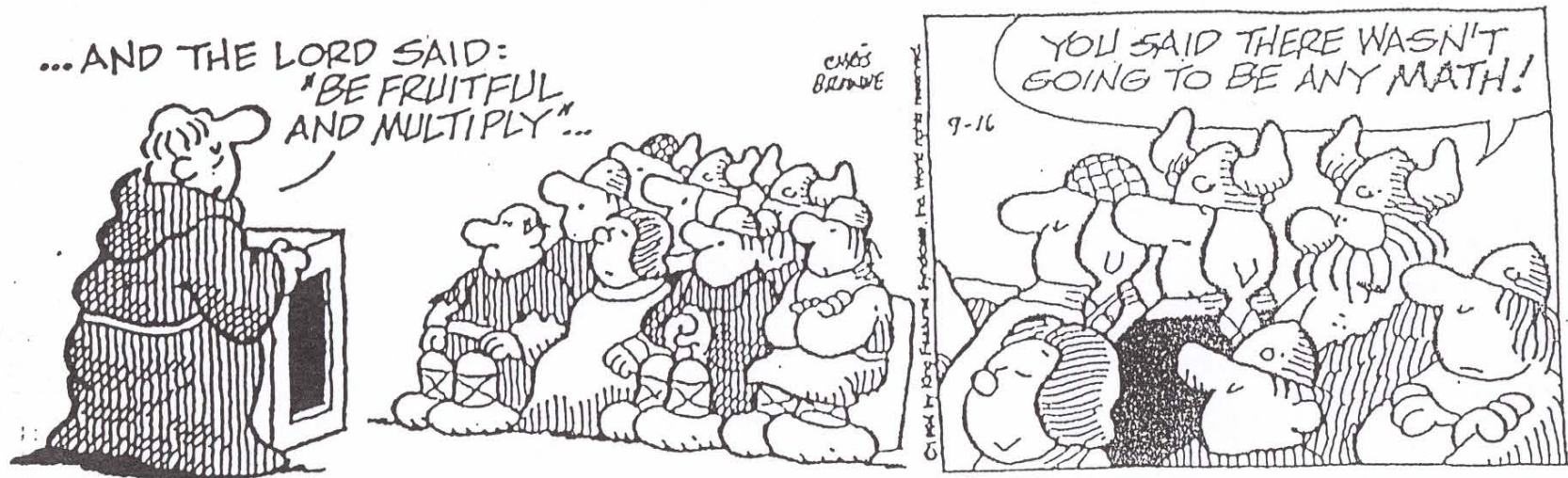
How to Use the Media to Teach Mathematics

- Authentic data to analyze can be found in newspapers daily, especially in the sports and business sections.
- Cartoons with a math focus make for interesting discussions and add humor to the discussions.
- Advertisements provide opportunities for students to develop into smart consumers through decision-making.

How to Use the Media to Teach Mathematics

- Math is conveyed (very large numbers are depicted differently in print according to locale and country; grocery ads represent decimals in various ways, etc.) in different ways.
- Innumeracies in print abound and provide subject matter for rich classroom discussions.
- Challenging problems appear in the *Ask Marilyn* column regularly.

What influences our views of mathematics?



Can you spot the error in the following coupon?



Dear Heloise: You recently asked for humorous incidents about cooking. Here is one of the best I have heard:

A cook complained that she couldn't double the recipe as the cookbook said because her oven would not bake at 850 degrees.

- Tom, Indianapolis

Which coupon would you use for this product?



Is the following a good deal?
Explain.

House Warming.

Get your home ready for the
holiday season now and save \$\$\$!
For a limited time, take $\frac{1}{2}\%$ OFF all
In-stock FABRICS and 20% OFF
on all CARPET & DRAPERIES!

Explain your strategy for redeeming your coupons at Randalls and at Rice Epicurian Markets.



twenty percent off

20%
off

Take 20% off one single item*.
Present this certificate.

Coupon expires 8/31/98. Only one to a customer. Not valid with

BED BATH & BEYOND

OFFICES: 110 BI-COUNTY BLVD. FARMINGDALE, NY 11735

BULK RATE
U.S. POSTAGE
PAID
BED BATH & BEYOND

\$5
off

five dollars off

WE SHIP ANYWHERE

**BED BATH &
BEYOND**

\$5 off any purchase of \$15 or more. Present this certificate.

Coupon expires 8/30/98. Only one to a customer. Not valid with any other offer. Not valid for purchase of gift certificates or Calphalon® products.

Which coupon would you use?

What A Sale!!!



This was contributed by Claudia Weitingner from Roberts Elementary. She uses this ad with her 2nd-grade students.

Explain what it means to "break even"
using the data represented in the graph.

break even

A key factor in deciding if it's worthwhile to refinance a loan is the amount of time it will take to recover the closing costs associated with a new loan. This chart gives an estimate of how long it would take to recoup those costs with the following assumptions:

- The new loan rate is 5.5 percent
- Closing costs amount to 2.25 percent of the new loan amount
- The borrower is refinancing from a 30-year loan to another 30-year loan
- The borrower has been paying on the current loan about two years



Source: The Mortgage Index

Frances Thiel design / Chronicle

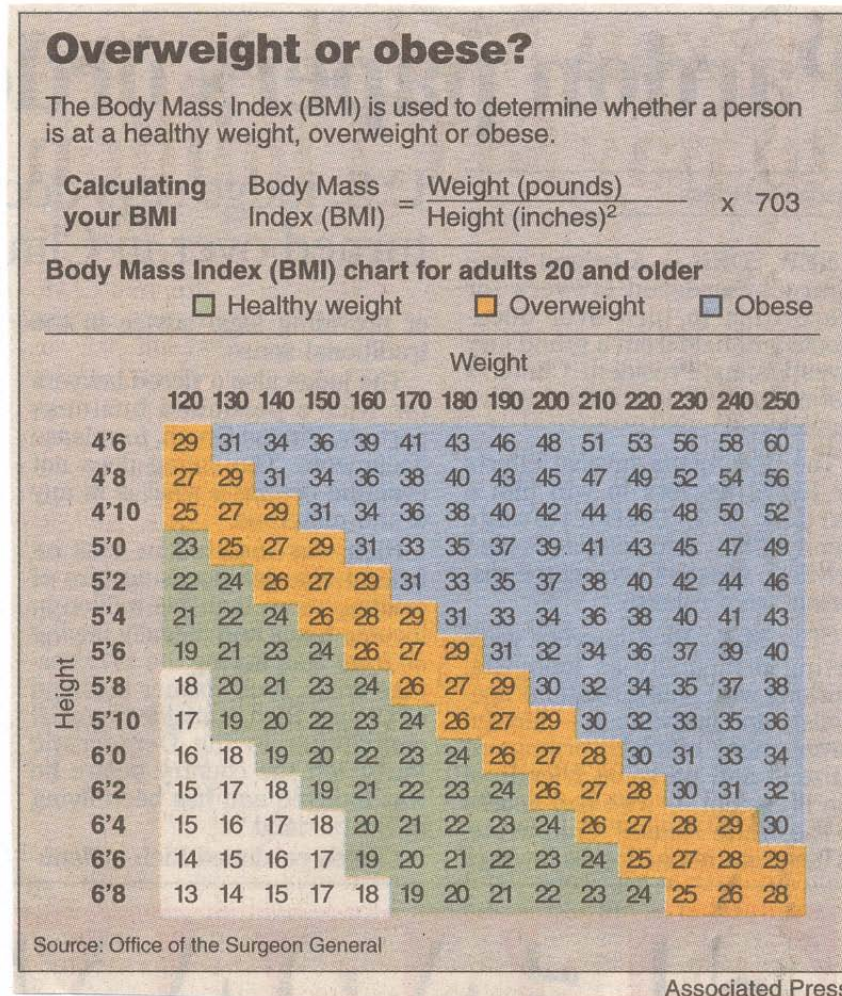
Ask Marilyn

The answer to a problem is 45678. You arrive at this by subtracting one number from another. The two numbers contain the digits 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. You must use each of these digits once, but only once. What two numbers do you subtract to arrive at this answer?

-Janis Bennion, Salt Lake City, Utah

This is a nice one for the math classes.

What is *YOUR* Body Mass Index?



Explain the mathematics in the ad.

Friday, Feb. 22, 2002

Houston Chronicle

★★

Future > Status Quo



invent²

Dear Ann Landers: I am a 47-year-old single mother. I own my home and car and consider myself intelligent and capable.

Here's the problem: I am in school to become a paralegal and must take algebra in order to get my degree. I will never use algebra in real life, nor is it a necessary component of being a paralegal. However, algebra is required in order for me to graduate.

I am terrible in math, Ann. I already have taken algebra once and failed. I am certain I will continue to fail, no matter how many times I take the class. Can you help me? I don't know what to do anymore.

--The Dummy in San Antonio

Dear San Antonio: I too, wonder why higher-level math classes are required for people who will never use them. Talk to the algebra teacher and ask for his or her assistance. Also, please consider hiring a tutor. The results will be worth it.

This letter and response appeared in the Houston Chronicle right before Ann Landers' death.

Here's the counterpart for geometry to the question "When will I use algebra?" that Ann Landers received. This comes from Ask Marilyn.

We're writing because our geometry teacher told us that if we get published (hint, hint), he will give us extra credit. Our question is: When in our life are we going to use proofs?

-Jen and Anne

Kaysville, Utah

You will use them every day, I hope, without knowing it. Geometry is beautifully logical, and it teaches you how to think and prove things that are so, step by step. Proofs are excellent lessons in reasoning. Without logic and reasoning, you are dependent on jumping to conclusions or –worse– having empty opinions.

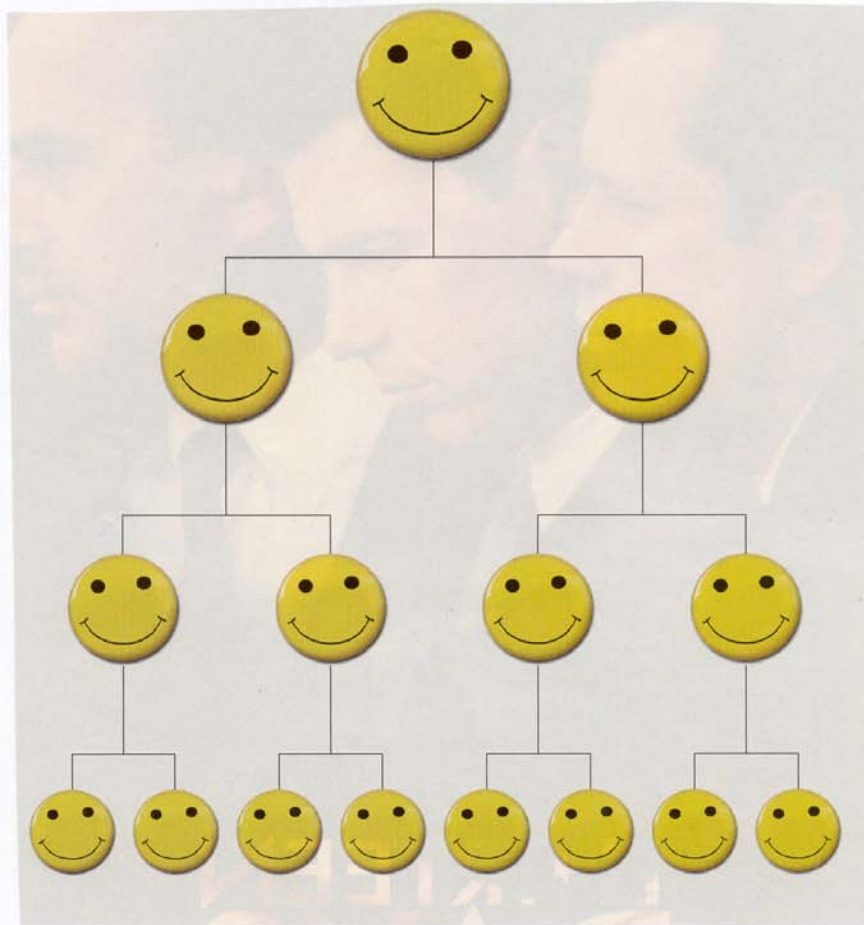
Here is a great article for discussion from Ask Marilyn.

Do you have any ideas about why more people don't understand math any better than they do? The problem seems to begin in school and the struggle- for too many – lasts a lifetime.

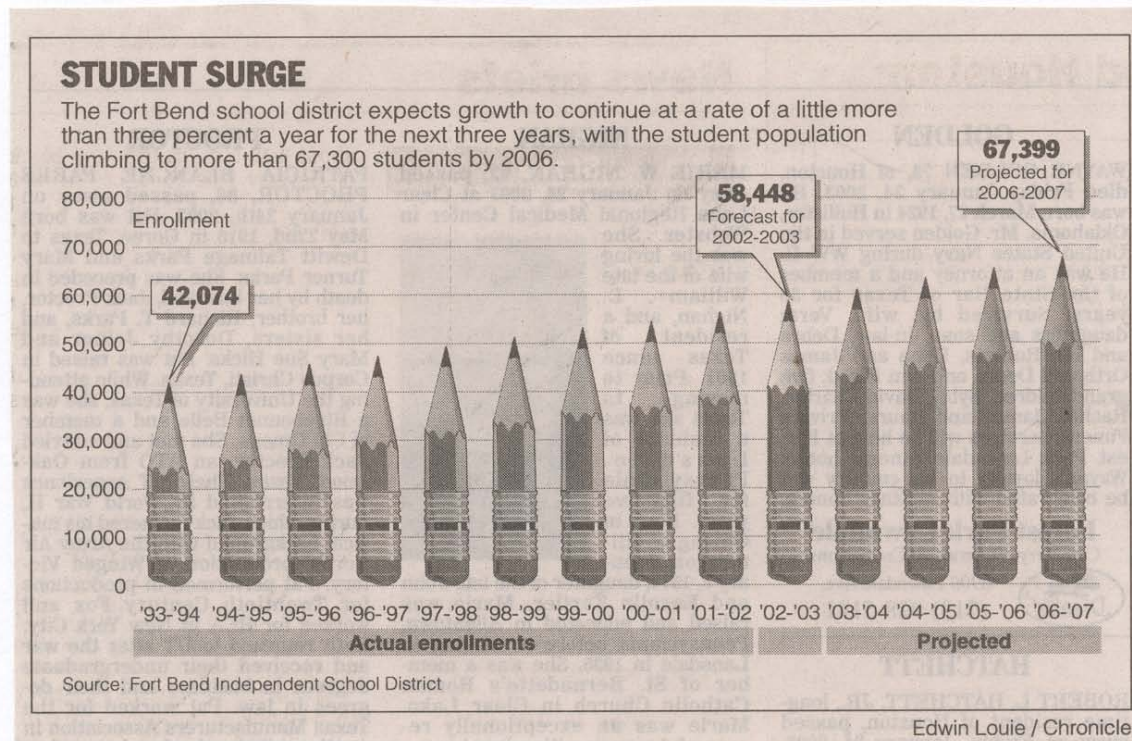
-Jean Acerra,
Newton, Mass.

I believe that much of the problem lies in the lack of logic and reasoning skills. Math is just logic with numbers and symbols attached, and success with it requires the ability to reason effectively. But children usually are taught ***what*** to think, not ***how*** to think. That's why so many adults live in a state of perpetual misunderstanding about the world.

Extend the *Smiley Face* pattern by drawing the next two rows of smiley faces. Describe the functional relationship depicted in the picture. Use your functional relationship to find the number of smiley faces on the twentieth row.



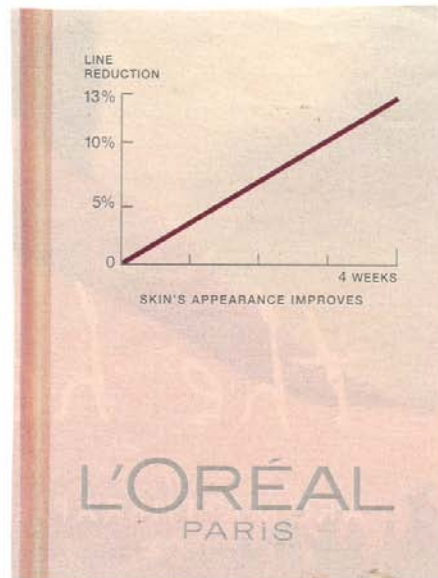
Write a mathematical function to describe the data graphed. Does the sentence at the top accurately describe the relationship depicted in the graph? Why or why not?



Explain in words and with an equation the functional relationship that the graph describes.

What is a reasonable domain for this function?

What is a reasonable range for this function?



In the following ad, describe the functional relationship graphically and in words.

- What is the domain of the function?
- What is the range of the function?

GOBBLE UP TO THREE TURKEYBUCKS PER VISIT!



SPEND \$30 = GET 1 TURKEYBUCK

SPEND \$60 = GET 2 TURKEYBUCK

SPEND \$90 = GET 3 TURKEYBUCK

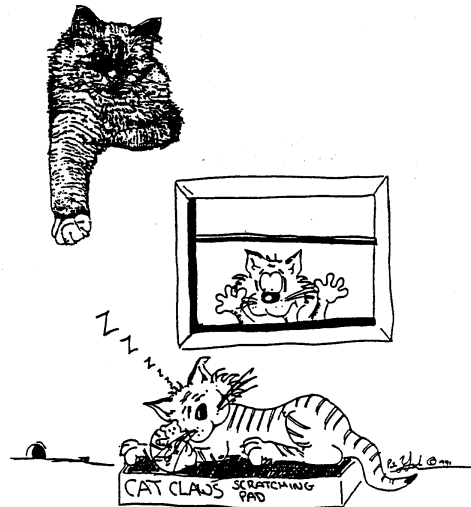
TURKEYBUCK + COUPON = SAVINGS!

CHECK YOUR WEEKLY AD FOR TURKEYBUCKS COUPONS!

Describe one of the functional relationships in the *Cat Claws Scratching Pad* ad graphically and in words.

What is the domain of your function?

What is the range of your function?



*The Purrfect Gift for Your Cat
--and for Anyone with Cats*

Cat Claws Scratching Pad

1 pad \$7.95,

2 to 5 pads \$6.75 ea.,

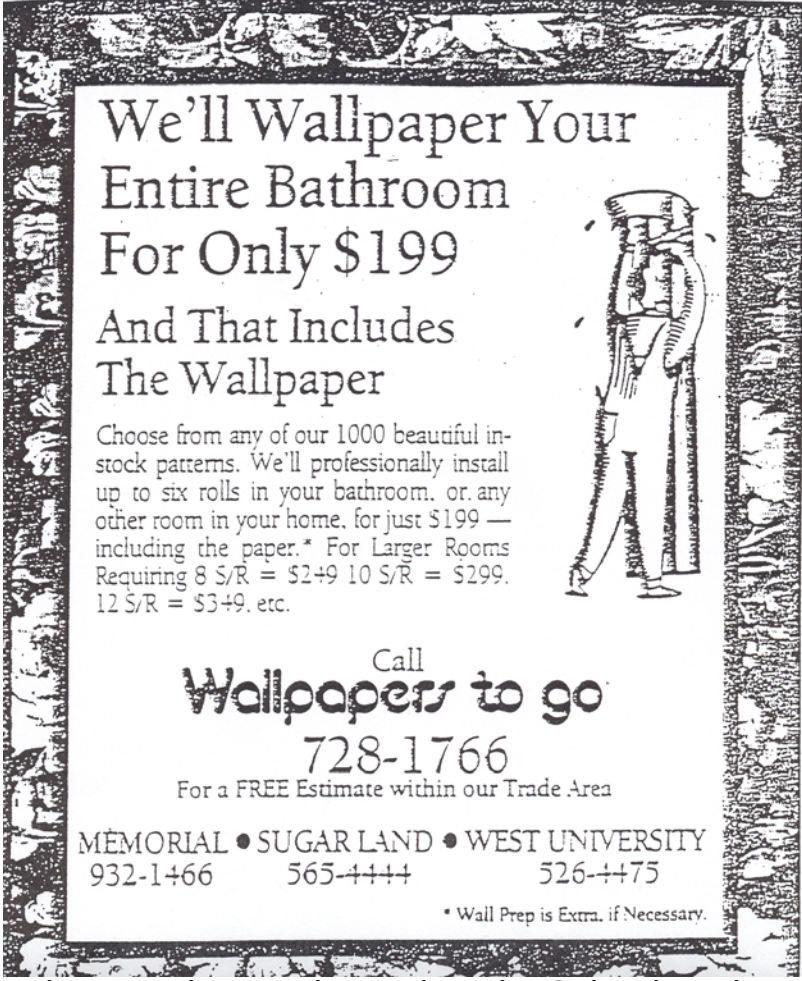
6 to 11 pads \$6.00 ea.,

**12 or more
\$5.00 ea.**

In the following ad, describe the functional relationship graphically and in words.

What is the domain of the function?

What is the range of the function?



We'll Wallpaper Your
Entire Bathroom
For Only \$199
And That Includes
The Wallpaper

Choose from any of our 1000 beautiful in-stock patterns. We'll professionally install up to six rolls in your bathroom, or any other room in your home, for just \$199 — including the paper.* For Larger Rooms Requiring 8 S/R = \$249 10 S/R = \$299. 12 S/R = \$349, etc.

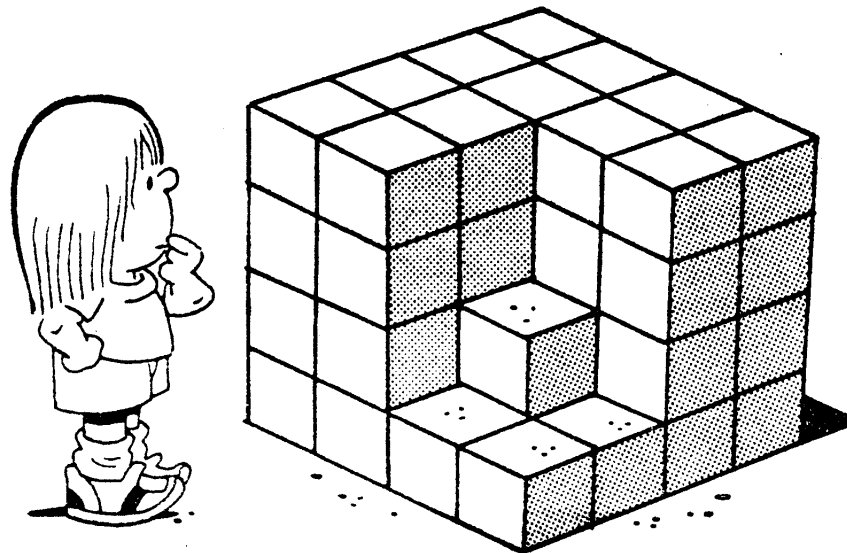
Call
Wallpapers to go
728-1766
For a FREE Estimate within our Trade Area

MEMORIAL • SUGAR LAND • WEST UNIVERSITY
932-1466 565-4444 526-4475

* Wall Prep is Extra, if Necessary.

BLOCKED OUT

THIS PUZZLE PILE WILL BLOCK YOU OUT. HOW MANY BLOCKS ARE MISSING FROM THE STACK? AFTER YOU'VE COUNTED THEM, TURN THE PICTURE UPSIDE DOWN AND STARE AT THE STACK. THE STACK WILL SEEM TO CHANGE POSITION, AND YOU WILL SEE THE MISSING BLOCKS.



Dick Rosen

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ANS: ELEVEN BLOCKS ARE MISSING FROM THE STACK.

From an *Ask Marilyn* Column

You once said researchers had determined that it would take seven ordinary shuffles to thoroughly mix a deck of cards. I regularly play a solitaire game that requires two decks. How many times should I shuffle them to get the same result?

-Diana Lewis, Clayton, Mo.

Nine times. Six decks require 12 shuffles. Casino owners won't be pleased to hear this, but fewer shuffles just aren't enough. More shuffles don't help much.

Can you describe the functional relationship in this problem?

Ask Marilyn

In a certain multiple-choice test, one question was illegible, but the following choice of answers was clearly printed. Which must be the right answer?

- 1) All of the below
- 2) None of the below
- 3) All of the above
- 4) One of the above
- 5) None of the above
- 6) None of the above

-Mark Johnson,
Spokane, Wash.

Construct an argument to support why 5 must be the correct answer.

So, what do we believe?

PSSSSST!!!!
Pass The Word

**DON'T BELIEVE
EVERYTHING YOU READ**

Post Oak Grill
Restaurants
are open as usual



*Enjoy Fine Dining,
Take out or Catering*

Lunch & Dinner
**1415 S. Post Oak Lane
(713) 993-9966**



Breakfast & Lunch
**Reliant Plaza,
1111 Louisiana
(713) 650-1706**

Lunch
**2777 Allen Parkway
(713) 831-2750**

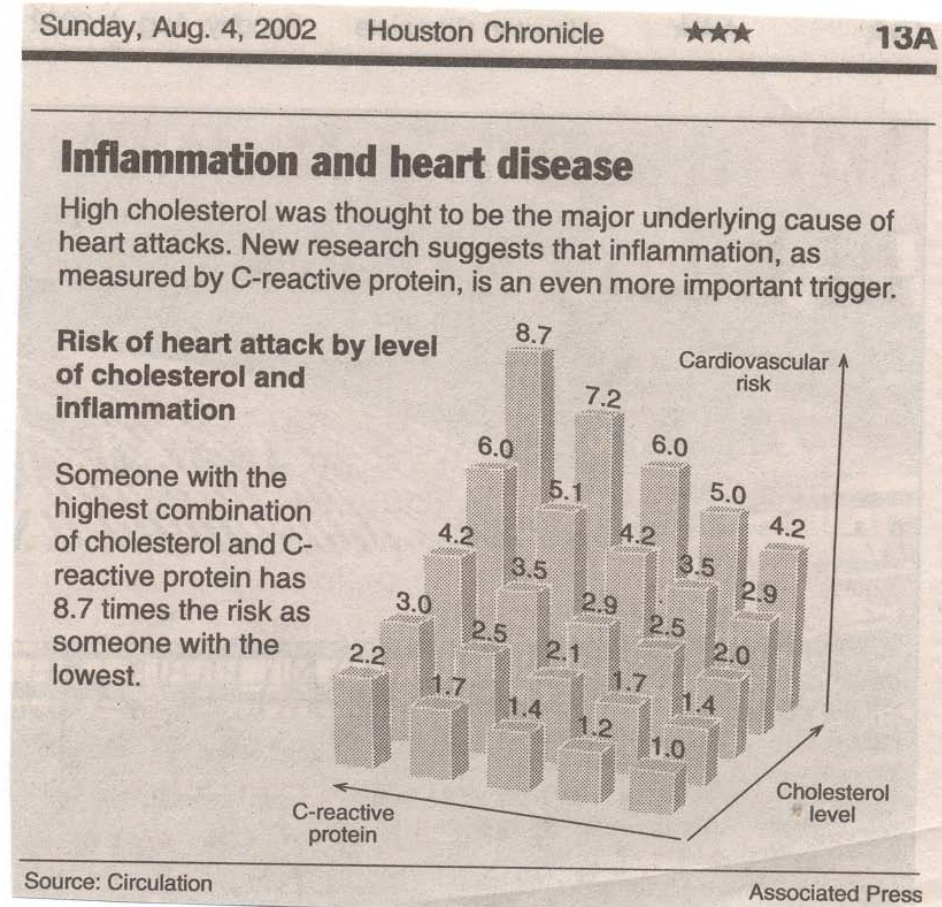
Friday, April 11, 2003 Houston Chronicle South 3G

Ask Marilyn

Say that a bottle and cork cost \$1.10 together. Also say that the bottle costs \$1 more than the cork. What does the cork cost?

- D. Blume, Annandale, Va.

Write a letter to your aunt or uncle explaining what this graph is reporting.



Write expressions for great fares for A, B, C, D and F students for trips to Phoenix, to San Jose and to Los Cabos.

GREAT FARES FOR EVERY KIND OF STUDENT.

A students $\$ \sqrt[3]{27} + 1296^{(\sin(\pi/6))} + (18/3)^2 - 6$

B students $\$ 3^3 + (5!/3) + \sqrt{4}$

C students $\$ 7^2 + (5 \times 4)$

D students $\$ 3 \times 23$

F students $\$ 69$
to Las Vegas
Each way, with round-trip purchase.

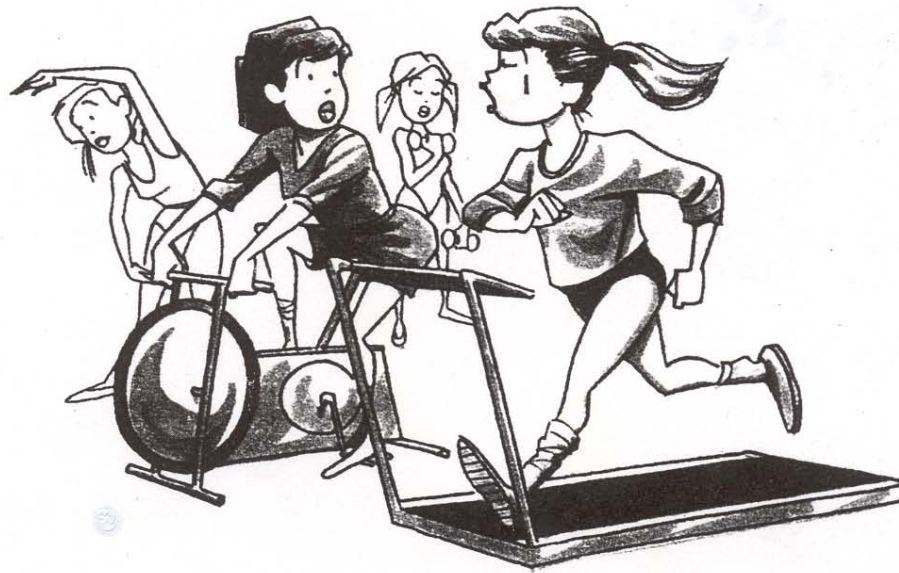
Money is green. (3RD GRADE LEVEL READING.) And you don't need a lot of it to fly on America West. (7TH GRADE LEVEL.) Our incredibly low fares make it more opportune than ever to holiday this Spring Break. (11TH GRADE LEVEL.) So, forthwith and heretofore, for advance booking (i.e., RESERVATIONS), promptly call, posthaste, your professional travel agent, or America West at 1-800-442-4934. (COLLEGE LEVEL.) To assist in ascertaining receipt of these diminutive expenditures, cordially see the ensuing données enumerated. (HELLO, MENSA.)

Phoenix	Burbank	Long Beach	Oakland	Ontario, CA	Orange Co.	San Jose	Mazatlan	Acapulco	Los Cabos
\$99	\$129	\$129	\$129	\$129	\$129	\$129	\$151	\$199	\$225

All fares shown above are each way, with round-trip purchase.

ALL AIRFARES QUOTED ABOVE are from Houston and are subject to change; seats are limited, may not be available on all flights and are available on America West-operated flights only. Tickets are nonrefundable, but may be reissued for a \$25 change fee. Fares require 7-day advance purchase and require 3-day minimum stay. Tickets must be purchased by 3/7/97 and travel completed by 5/27/97. International taxes and/or fees additional, approx. \$32 (Mexico). Only final dollar value stated in non-equation form will be honored. Additional restrictions may apply. ©1997 America West Airlines. Visit us at <http://www.americawest.com>

Draw a distance-time graph to explain mathematically what she is saying. Label your axes.



"I haven't lost any weight, but I've slowed my rate of increase."

Is this all calculus? Can you find the errors?

$y = f(x_1, x_2, x_3, x_4) = 2x_1 + x_2 x_3 x_4$ $x^{\frac{1}{2}} = \sqrt{x}$
 $y = f(x) = \frac{2x^2 + 18 + x}{x} > 0$ $a^2 + b^2 = c^2$
 $b^{-n} = \frac{1}{b^n}$ and $\frac{1}{b^{-n}} = b^n$ $b^{\frac{n}{d}} = (\sqrt[d]{b})^n = \sqrt[d]{b^n}$
 $m = \frac{\Delta y}{\Delta x} = \frac{x^2 - x^1}{x^2 - x^1}$ $C(x) = 20 + 2x + 0.01x^2$
 and $x \geq 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $x^n dx = \frac{x^{n+1}}{n+1} + C$ $n \neq -1$ $\frac{2}{7p} = \frac{2p}{7}$
 $D(p) = \sqrt[3]{p^2 + 1}$ and $p^{\frac{2}{3}} = \sqrt[3]{p^2}$
 $y = \frac{4ac - b^2}{4a}$ $y = f(x) = ax^3 + bx^2 + cx + d$
 If $f(x) = \frac{N(x)}{D(x)}$, then $f'(x) = \frac{D(x) \cdot N'(x) - N(x) \cdot D'(x)}{[D(x)]^2}$
 $\frac{du}{dx} = 2x - 1$ $f''(x) = 12x^2$ $f(x) = \frac{1}{3}x^{12} - 3x^2 + \sqrt{5}x$
 $f'(x) = \frac{x \frac{d(2x^2 + 18 + x)}{dx} - (2x^2 + 18)}{x^2}$ $f'(x) = \frac{x^2 - 1}{x^2}$
 $y = \sqrt{1 - 3x^2} = (1 - 3x^2)^{\frac{1}{2}}$ $\frac{dy}{dx} = \frac{1}{2}(1 - 3x^2)^{-\frac{1}{2}} \cdot \frac{d}{dx}(1 - 3x^2)$

Calculus.

Do you miss it?

You won't miss your long distance company either

Introducing Southwestern Bell Long Distance. Simply put, it's nine cents a minute, in state or out. With no hidden fees or time-of-day restrictions. And just one bill to pay. For long distance calling without the hassles of your long distance company, call 1-877-PICK-SWB or visit us at swbell.com.

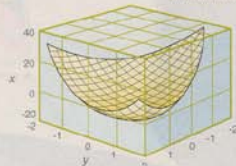
Southwestern Bell

What is this ad saying?

More than you need to know.

Concave Triangular Surfaces and You.

Maximum curvature = Serious dippability



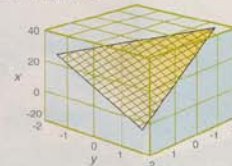
Concave: good

Figure 7 shows the graph of the function f in Example 6 and the graphs of its first- and second-order partial derivatives for $-2 < x < 2$, $-2 < y < 2$.

Torengos Theorem

Suppose f is defined on a disk D that contains f

$$f_{xy}(a,b) = f_{yx}(a,b)$$



Flat: flat

EXAMPLE 2 $\square$ If $f(x,y) = 4 - x^2 - 2y^2$, find $f_x(1,1)$ and $f_y(1,1)$ and interpret these numbers as slopes.

$$f_x(x,y) = -2x$$

$$f_x(1,1) = -2$$

$$f_y(x,y) = -4y$$

$$f_y(1,1) = -4$$

The graph of f is the paraboloid $z = 4 - x^2 - 2y^2$ and the vertical plane $y = 1$ intersects it in the parabola $z = 2 - x^2$.

All you need to know.

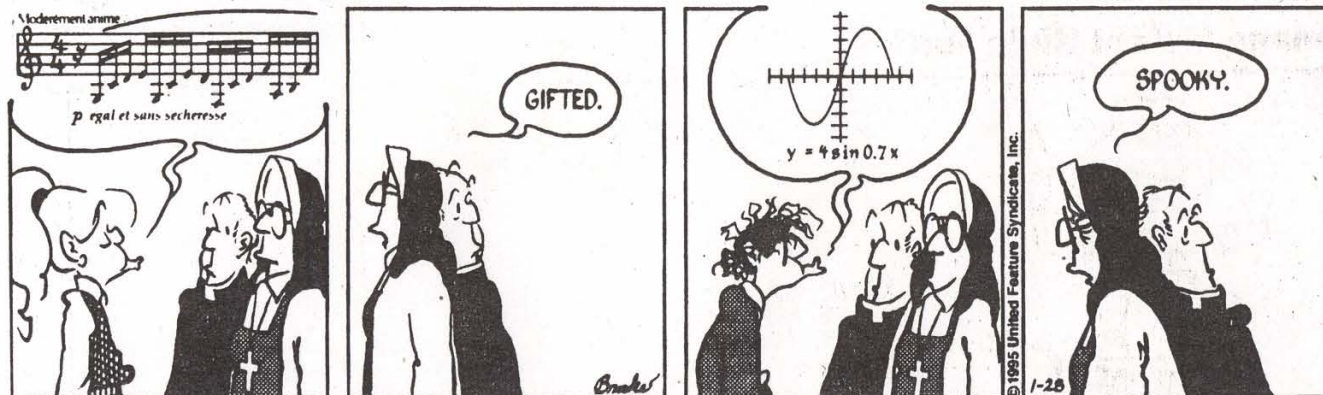


Curved for
Serious
Dipping

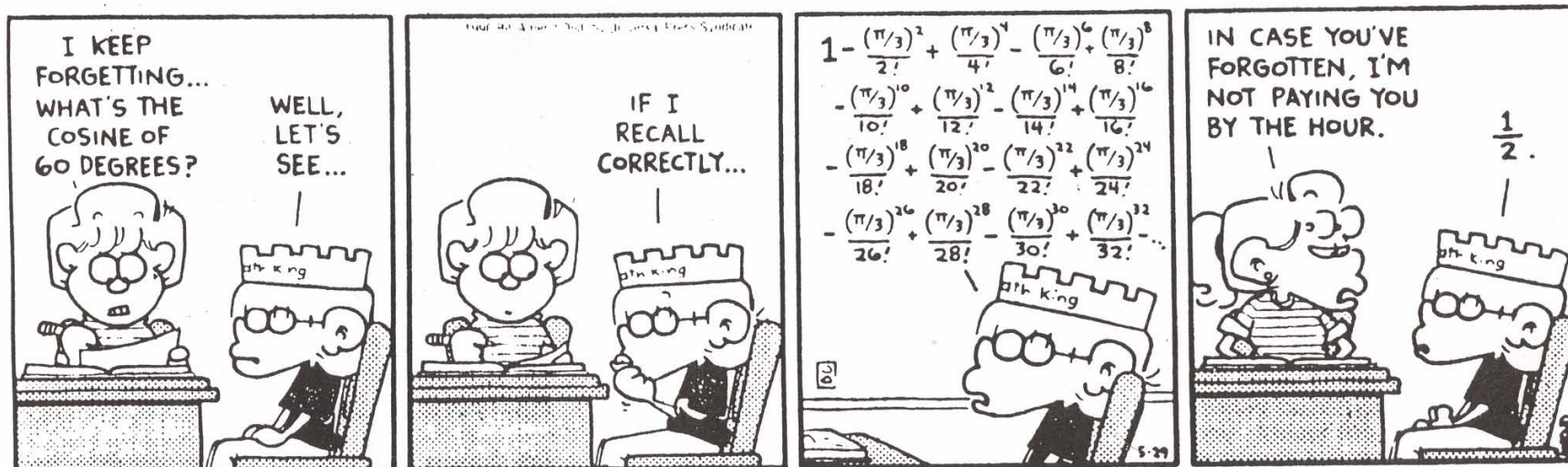


Advanced humor?

9 Chickweed Lane

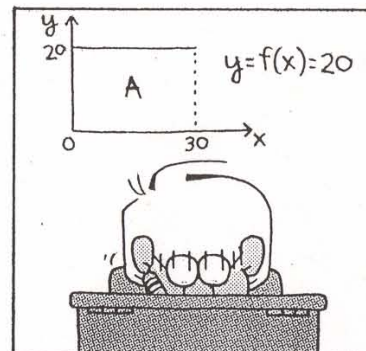
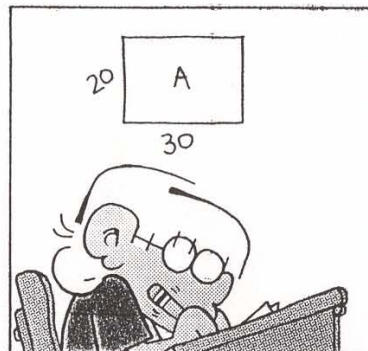
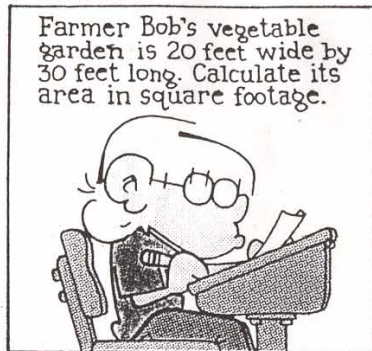


Fox Trot

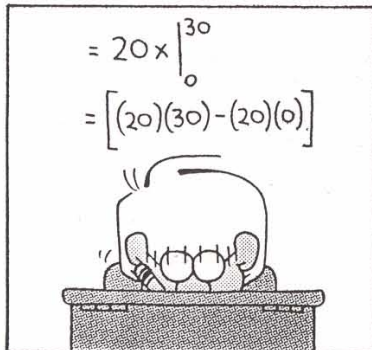
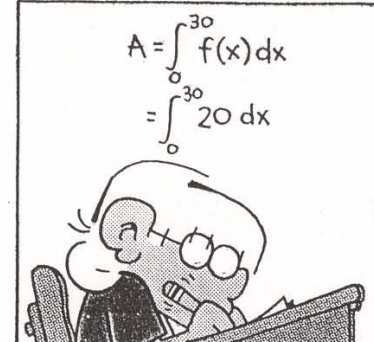


Advanced humor?

FOXTROT



BY BILL AMEND



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9-19



Some other ideas on what you can have your students do:

- Get an ad such as one from Target, Randalls, or Penney's. Have students find numbers greater than or less than a given number in the ad. Or give students a fixed amount of money to spend; let them find several combinations of items that they can purchase with that amount.
- Have students research how Stock Market reporting has changed (fractions to decimals).
- Have students analyze the game statistics after a football game, baseball game, or basketball game.

Some other ideas on what you can have your students do:

- Have students answer the Marilyn Vos Savant math questions in a letter to Marilyn. Remember the interest created by the Monte Hall *Let's Make a Deal* question that appeared in her column years ago.
- Have students create a book of innumeracies and then have students follow up with the businesses that made the math mistakes.
- Have students select a cartoon to enlarge to twice its size.

Some other ideas on what you can have your students do:

- Have students find examples of functions in the newspaper. Have them represent each functional relationship depicted as a set of ordered pairs, a graph, and an equation. Justify why each is a function.
- Have students create a book on how very large and very small numbers are depicted around the United States and around the world using printed materials.