Using the Media to Learn Mathematics

Anne Papakonstantinou, Ed. D.
Director
Rice University School Mathematics 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?

...AND THE LORD SAID: "BE FRUITFUL AND MULTIPLY..."

CHRISS

YOU SAID THERE WASN'T GOING TO BE ANY MATH!

9-16
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.
Which coupon would you use?
What A Sale!!!

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

Anne Papakonstantinou– Rice University School Mathematics Project
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?

The Body Mass Index (BMI) is used to determine whether a person is at a healthy weight, overweight or obese.

Calculating your BMI

\[
\text{BMI} = \frac{\text{Weight (pounds)}}{\text{Height (inches)}^2} \times 703
\]

Body Mass Index (BMI) chart for adults 20 and older

<table>
<thead>
<tr>
<th>Height</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>4'6</td>
<td>29</td>
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<tr>
<td>4'8</td>
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<td>6'4</td>
<td>14</td>
</tr>
<tr>
<td>6'6</td>
<td>13</td>
</tr>
</tbody>
</table>

Source: Office of the Surgeon General

Anne Papakonstantinou—Rice University School Mathematics Project
Explain the mathematics in the ad.

Future > Status Quo

invent²

Anne Papakonstantinou– Rice University School Mathematics Project
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?

**STUDENT SURGE**

The Fort Bend school district expects growth to continue at a rate of a little more than three percent a year for the next three years, with the student population climbing to more than 67,300 students by 2006.

<table>
<thead>
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<th>Year</th>
<th>Actual</th>
<th>Projected</th>
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<tbody>
<tr>
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<td>58,448</td>
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<tr>
<td>'94-'95</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>'06-'07</td>
<td></td>
<td>67,399</td>
</tr>
</tbody>
</table>

67,399 Projected for 2006-2007

Source: Fort Bend Independent School District
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 = 1 Turkeybuck

Spend $60 = 2 Turkeybucks

Spend $90 = 3 Turkeybucks

Turkeybuck + [Coupons] = 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 Perfect 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?
**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.

**Ans:** Eleven blocks are missing from the stack.
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?
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.

Inflammation and heart disease
High cholesterol was thought to be the major underlying cause of heart attacks. New research suggests that inflammation, as measured by C-reactive protein, is an even more important trigger.

Risk of heart attack by level of cholesterol and inflammation
Someone with the highest combination of cholesterol and C-reactive protein has 8.7 times the risk as someone with the lowest.
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, post haste, 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 donnees enumerated. (Hello, Menia.)

<table>
<thead>
<tr>
<th>Phoenix</th>
<th>Burbank</th>
<th>Long Beach</th>
<th>Oakland</th>
<th>Ontario,CA</th>
<th>Orange Co.</th>
<th>San Jose</th>
<th>Mazatlan</th>
<th>Acapulco</th>
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<tbody>
<tr>
<td>$99</td>
<td>$129</td>
<td>$129</td>
<td>$129</td>
<td>$129</td>
<td>$129</td>
<td>$129</td>
<td>$151</td>
<td>$199</td>
<td>$225</td>
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</table>

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 3/27/97. International taxes and/or fees additional, approx. $32 (Mexico). Onlyfinal dollar value stated in nonrefundable 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."

PARADE MAGAZINE · JULY 9, 2000 · PAGE 13
Anne Papakonstantinou– Rice University School Mathematics Project
Is this **all** calculus? Can you find the errors?
More than you need to know.

**Concave Triangular Surfaces and You.**

- **Concave: good**
- **Flat: flat**

**Example:**

- \( f(x,y) = x + y \)
- \( f(1,1) = 2 \)
- \( f_y(1,1) = 1 \)
- \( f_{xy}(1,1) = 1 \)

**Theorems:**

- **To theorems:**
  - Suppose \( f \) is defined on a disk \( D \) that contains \( a \).
  - \( f(x,y) = f_y(x,y) = f_{xy}(x,y) \)

All you need to know.

Curved for Serious Dipping

Anne Papakonstantinou– Rice University School Mathematics Project
Advanced humor?

9 Chickweed Lane

Gifted.

Spooky.

y = 9sin 0.7x

Fox Trot

I keep forgetting... What's the cosine of 60 degrees?

Well, let's see...

If I recall correctly...

1 - (π/3)^2 + (π/3)^4 - (π/3)^6 + (π/3)^8
- (π/3)^10 + (π/3)^12 - (π/3)^14 + (π/3)^16
- (π/3)^18 + (π/3)^20 - (π/3)^22 + (π/3)^24
- (π/3)^26 + (π/3)^28 - (π/3)^30 + (π/3)^32

In case you've forgotten, I'm not paying you by the hour.

1/2
Advanced humor?

FOXTROT

Farmer Bob's vegetable garden is 20 feet wide by 30 feet long. Calculate its area in square footage.

20

30

A

y = f(x) = 20

0

30

x

A = \int_{0}^{30} f(x) \, dx = \int_{0}^{30} 20 \, dx

= 20 \times \left[ \frac{x^3}{3} \right]_0^{30}

= (20)(30) - (20)(0)

= 600 \text{ ft}^2

BY BILL AMEND

CALL ME MR. RIGOROUS.

JASON, HERE'S YOUR QUIZ BACK FROM LAST WEEK.
Babe's

HAPPY HOUR
11am - 8pm

TOPLESS AMATEUR
Dance Contest
Tuesday Nights

FREE LUNCH
served daily

$1.75 Draft BEER
All day All night!

.96¢ Draft BEER
Open 11am - 8pm

Free Seafood Buffet
Fridays 5pm - 8pm

(713) 781-3675

5614 Hillcroft at Westpark

No cover charge till 7pm!!

Anne Papakonstantinou– Rice University School Mathematics Project
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.