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that vivify such a system in the U.S. and in Japan. There are some surprises here that have relevance to college classrooms.

NOTES AND REFERENCES

¹U.S. Department of Education, National Center for Education Statistics (February 1999). *The TIMSS Videotape Classroom Study: Methods and Findings from an Exploratory Research Project on Eighth-Grade Mathematics Instruction in Germany, Japan, and the United States,* NCES 99-074, by James W. Stigler, Patrick Gonzalez, Takako Kawanaka, Steffen Knoll, and Ana Serrano. Washington, D.C.: U.S. Government Printing Office, 1999. Note that this article is available on the Web at http://nces.ed.gov/pubs99/timssvid/, or as a link from the authors' Web site given below.

²James W. Stigler and James Hiebert (1997). "Understanding and

Improving Classroom Mathematics Instruction," Phi Delta Kappan. This article is available on the Web as specified in the next footnote.

- ³ http://www.kiva.net/~pdkintl/kappan/kstg9709.htm or as a link from the authors' Web site, given in the next footnote.
- ⁴ The Teaching Gap authors' Web site is: http://www.lessonlab.com/teaching-gap
- ⁵ Steve Olson (May/June 1999). "Candid Camera," Teacher Magazine on the Web. *The Teaching Gap* authors' Web site has a link to this article.
- ⁷Harold W. Stevenson and James W. Stigler (1992). *The Learning Gap.* New York (Simon & Schuster Inc.).
- ⁷ Steve Olson, "Candid Camera," op. cit.
- ⁸ This quote, along with all others not footnoted, is from *The Teaching Gap*.

Funny Problems

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A selection of original or collected recreational mathematical problems. Solution:

33 cut in half horizontally will make four pieces.

- Prove that 2 = 1 Solution:
 2 pints = 1 quart.
- 2) A man weighs the following weights on the following dates. How is this possible?

6/1/70	150 lbs.
6/3/70	0 lbs.
6/5/70	25 lbs.
6/7/70	0 lbs.
6/9/70	145 lbs.

Solution:

The man is an astronaut who went to the moon and back.

Outerspace weightlessness: 0 lbs.

 $\frac{1}{6}$ of Earth's gravity, or gravity of the moon: 25 lbs.

3) If you have a couple of threes and divide them in half, why do you end up with 4 pieces?

- 4) How 70 > 3 = LOVE? *Solution:* Move the characters of 70 > 3 around.
- 5) 10 1= 0 Solution:
 If you have a stick (1) and an egg (0) and you give away the stick (1) you still have the egg (0) left.
- 6) All monkeys eat bananas. I eat bananas. Therefore, I am a monkey!
- 7) Twelve minus one is equal to two. *Solution:*12 1 = 2 (take digit 1 from 12).
- 8) 7 + 7 = 0. Solution: Take the sticks from the 7's and rearrange them to form a rectangular zero 0.

9) $3 \times 2578 = hell$

Solution:

Read your calculator upside down: 7734 (the product of the numbers) becomes hell (approximately).

10) An earthworm is cut down the middle. How many halves are there? *Solution:*

One, because the other half can still be one whole earthworm.

11) From two false hypotheses get a true statement. *Examples:*

a)	Grass is edible.	(False)
	Edible things are green.	(False)
	Therefore, grass is green.	(True)
b)	All dogs are poodles.	(False)
	Spot is a dog.	(False)
	Thus, Spot is a poodle.	(True)

12) How can you add 3 with 3 and get 8? *Solution:*

Turn one of the threes around and put them together to make an 8 (approximately).

- 13) If 10 trees fall down, and no one is around to hear them falling, how many of the trees fall? *Solution:* Ten.
- 14) When algebraically 1=0? *Solution:*

In a null ring, which is a set with only one element and one binary operation. If we take for "+" and for the same operation, we get a commutative unitary ring.

In this case, the unitary element for "*" (which is normally denoted by "1") and the null element, (which is normally denoted by "0") coincide.

- 15) When is it possible to have: 1 + 1 = 10? *Solution:* In base 2.
- 16) Another logic:

How can we have ten divided by two equal to zero?

Solution:

Ten cookies divided by two kids are eaten and nothing remains!

17) You are lost and walking down a road. You want

to get to town and know the road leads to town but don't know which direction. You meet two twin boys. You know one boy always tells the truth and one always lies. The boys know the direction to town. You cannot tell the boys apart and can only ask one question to one boy to find the direction to town. What question should you ask? *Solution:*

Ask either boy what the other boy would say is the direction to town. This would be a lie because if you were asking the dishonest boy he would tell you a lie. If you were asking the honest boy he would tell you the truth about what the dishonest boy would say (which would be a lie) so he would give you the wrong direction. Town would then be in the opposite direction.

18) Why are manhole covers round? You know, the manholes on the streets, is there a reason why they made them round or could they be square or triangular?

Solution:

Manhole covers are round because a circle cannot fall inside of itself. If they were square, triangular or some other shape they could be dropped into the hole, which would be dangerous to traffic.

19) You have eleven lines. How can you move five lines and still have nine? *Solution:*

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20) You have a cannon and two identical cannon balls. You take the cannon to a large open location that is perfectly flat and you adjust the cannon barrel so that it is perfectly level. You load one of the cannon balls into the cannon and you hold the other cannon ball at the same height as the barrel. You fire the cannon and drop the other cannon ball at the same time. Which cannon ball will hit the ground first?

Solution:

Both cannon balls should hit the ground at the same time, since gravity acts equally on two objects having the same mass. The cannon barrel was leveled and the cannon ball would begin to fall as it moved forward out of the barrel at the same rate as the cannon ball that was dropped by hand. They would hit at the same time but the cannon ball fired from the cannon would hit the ground far away.