# FUN WITH FUNDAMENTALS

## Bank shot

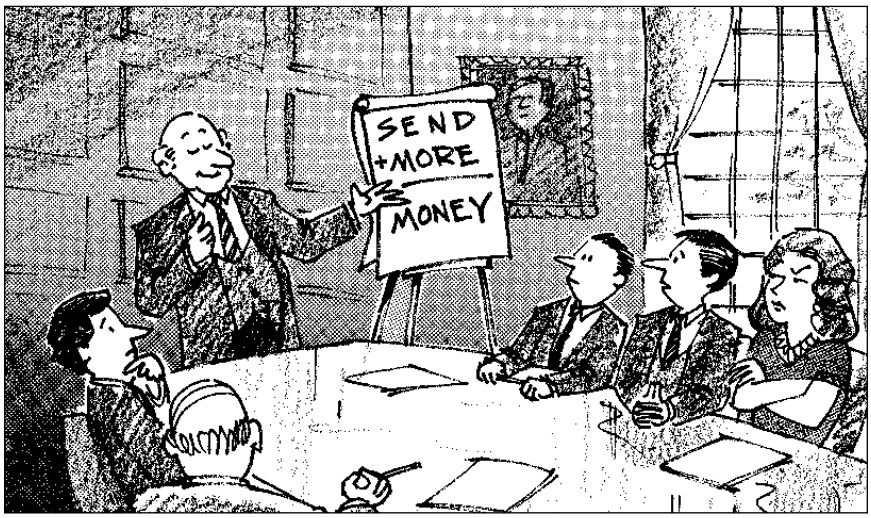
**Problem 169 —** Money is the root of all fine print, as this month's problem by Walter Jasiolek of Northville, Mich., demonstrates

"Fellow employees," intoned T. Bone More, president of the More Bank & Trust, "I've come all the way from my office to this meeting room to explain our new loan program, the Strategic Equity New-model Draft program or SEND.

"The loan period is one year," continued More. "Our logo is this:

SEND
+ MORE
MONEY

"The computer program that calculates the interest is configured so that SEND is the principal borrowed by the customer, MORE is the interest we charge," chuckled More, "and MONEY is what the customer pays back."




If each letter of the letter represents a unique, whole number between 0 and 9, inclusive, and "M" $\neq 0$, what is the principal, interest, and total amount?

Send your answer to:
Fun With Fundamentals
POWER TRANSMISSION DESIGN
1100 Superior Ave.
Cleveland, OH 44114-2543

*Technical consultant: Jack Couillard, Menasha, Wis.*

**Solution to last month's problem 168** — You rarely go around in circles if you **answered 43.6 mph.**. Here's how Bluff got "up to speed."

For the system to be in equilibrium, each time Wurme and the boat make a revolution, Bluff and the inner tube must also make a revolution.

Recognizing this, the basic equation for angular velocity is:

$$v = r\,\omega$$

Where:

$v$ = linear velocity of boat, given as 20 mph

$\omega$ = angular velocity, radians per sec

$r$ = radius of circle traveled by boat, given as 50 ft.

$$\omega = \frac{v}{r} = \left(\frac{20 \text{ mph}}{50 \text{ ft}}\right) = \text{ a constant}$$

Since $\omega$ is a constant, all we need is the inner tube's radius to solve for its velocity. Using trigonometry:

$b = 75 \text{ ft} \times \sin 30 = 37.5 \text{ ft}$

$A = 75 \text{ ft} \times \cos 30 = 64.95 \text{ ft}$

Using the formula for a right triangle:

$$C^2 = A^2 + B^2$$

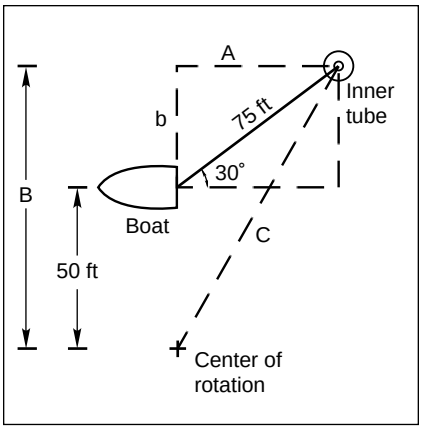
$$C = \sqrt{A^2 + B^2}$$

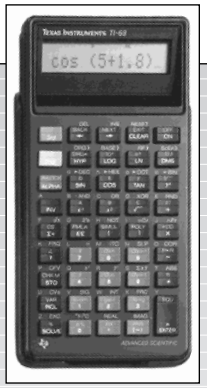
$$= \sqrt{(64.95)^2 + (50 + 37.5)^2} = 109 \text{ ft}$$

The inner tube's velocity is then:

$$C\omega = (109 \text{ ft})\left(\frac{20 \text{ mph}}{50 \text{ ft}}\right) = 43.6 \text{ mph}$$

Wurme still knows all the angles!




**Contest winner** — Congratulations to Jack Nelson of Portland, Ore., who won our November contest by having his name drawn from the 327 contestants who answered correctly out of a total of 357 for that month. A TI-68 calculator is in the mail to him.

The TI-68 Advanced Scientific Calculator by Texas Instruments can solve five simultaneous equations with real and complex coefficients and has 40 number functions that can be used in both the rectangular and polar coordinate systems. Other functions include formula programming, integration, and polynomial root finding. The calculator also features a last-equation replay function that lets you double-check your work.

To enter the contest, send your answer on a postcard or letter to POWER TRANSMISSION DESIGN, 1100 Superior Ave., Cleveland, OH 44114-2543.

You can also receive a TI-68 and credit in the magazine if you send in an *original* problem with solution, and we publish it.