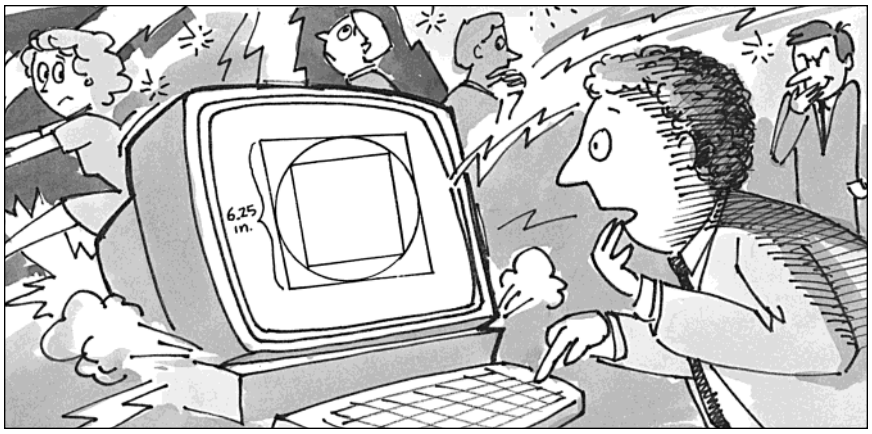
FUN WITH FUNDAMENTALS

Screen test

Problem 175 — What you see is not always what you get, as this month's problem by Dale W. Smith of Pomona, Calif., demonstrates.

"Why, it's my very own invention," crowed Lucius Bluff. Most of the staff of the Lee Key Hydraulic Co. had gathered in Bluff's office for the unveiling of his new computer-aided design software package. "You can draw your design and then access Lee Key's catalog from this special menu. After you've found the right component, you press this button. The program inserts the component and begins filling out an order form.

"The highlight of the package is a powerful tool called the 'Outer Limit' function. Let's say you want to draw two shapes that are similar but different sizes. You merely draw the first shape and then type in the percentage reduction or enlargement of the second shape, and the program draws it automatically. Here's a simple demonstration."



With a flourish, Bluff sat down at the terminal and drew a square with 6.25-in. sides. He then inscribed a circle with a circumference that touched the sides of the square. "Now for the 'Outer Limit!' " A sneeze that sounded somewhat like a snicker was heard in the audience.

"I am now going to inscribe a square that is 25% smaller than the first square in the circle." Bluff typed away and lights all over the workstation began flickering wildly. The computer generated the pictured drawing and then crashed.

Neglect line width on the drawings. How much smaller is the second square than the first? Will Bluff be working on a revision?

Send your answer to:

Fun With Fundamentals
POWER TRANSMISSION DESIGN
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Cleveland, OH 44114-2543

Technical consultant, Jack Couillard, Menasha, Wis.

Solution to last month's problem 174 — You know how to water down statistics, if you answered **5.51×10^9 ft^3.**

Half of the population are women, and women weigh 75% of what men weigh for each weight category. We can then multiply the total population, 5×10^9, by ($^1/_2 + {}^{0.75}/_2$) or, 0.875 to get the exact weight for each category.

Let $X = 5 \times 10^9 \times 0.875 = 4.375 \times 10^9$ "equivalent" people.

Multiply X by the weight and percentage of population for each weight category:

$(6 \text{ lb})(0.05)X = 1.31 \times 10^9$ lb
$(15 \text{ lb})(0.034)X = 2.23 \times 10^9$
$(25 \text{ lb})(0.015)X = 1.64 \times 10^9$
$(43 \text{ lb})(0.034)X = 6.40 \times 10^9$
$(60 \text{ lb})(0.05)X = 1.31 \times 10^{10}$
$(93 \text{ lb})(0.09)X = 3.66 \times 10^{10}$
$(125 \text{ lb})(0.13)X = 7.11 \times 10^{10}$
$(138 \text{ lb})(0.09)X = 5.44 \times 10^{10}$
$(150 \text{ lb})(0.05)X = 3.28 \times 10^{10}$
$(155 \text{ lb})(0.06)X = 4.07 \times 10^{10}$
$(160 \text{ lb})(0.067)X = 4.69 \times 10^{10}$
$(155 \text{ lb})(0.067)X = 4.54 \times 10^{10}$
$(150 \text{ lb})(0.067)X = 4.40 \times 10^{10}$
$(145 \text{ lb})(0.06)X = 3.81 \times 10^{10}$
$(140 \text{ lb})(0.05)X = 3.06 \times 10^{10}$
$(135 \text{ lb})(0.034)X = 2.01 \times 10^{10}$
$(130 \text{ lb})(0.015)X = 8.53 \times 10^9$
$(125 \text{ lb})(0.014)X = 7.66 \times 10^9$
$(120 \text{ lb})(0.01)X = 5.25 \times 10^9$
$(115 \text{ lb})(0.008)X = 4.03 \times 10^9$
$(110 \text{ lb})(0.005)X = 2.41 \times 10^9$

Total the weight and get 5.13×10^{11} lb. This is the weight of all humanity. Since water content is given as 67%, multiply 5.13×10^{11} by 0.67 to get 3.44×10^{11} lb for the weight of water contained in the human race.

To get the cubic footage, multiply the following:

$$3.44 \times 10^{11} \text{ lb} \times \frac{1 \text{ gal.}}{8.345 \text{ lb}} \times \frac{0.1337 \text{ ft}^3}{1 \text{ gal.}}$$

$$= 5.51 \times 10^9 \text{ ft}^3$$

This equates to an area approximately 14×14 miles by 1 ft deep. A drop in the bucket compared to the oceans and large lakes!

Contest winner — Congratulations to David Daley of Manchester, Conn., who won our June contest by having his name drawn from the 64 contestants who answered correctly out of a total of 65 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.