

# FUN WITH FUNDAMENTALS



## Big bang theory

**Problem 172** — Lighting up the night can be a dangerous occupation, as this month's problem by Mark Fosmoen of Sterling Hts., Mich., demonstrates.

Once again, a myriad of workmen graced the habitation of Phineas Gotrocks, Esq. The occasion was yet another gala soiree, and as usual, Gotrocks spared no expense. As servants scurried about, a sputtering red truck pulled up, and a little man with a large cylindrical

package got out.

"Here's the special-order rocket ya wanted, Mr. Rotgocks," drawled Aloysius Kaboom. I put 100 in. of wick on the fireworks, so that they'll be sure to go off when the rocket reaches maximum height."

"That's Gotrocks! You can set it up over there!"

Kaboom placed the rocket so that it would shoot straight up. He loaded it with enough black powder to burn for 8 sec and provide a constant acceleration of 60

fps<sup>2</sup>. He then strapped on the fireworks and attached wicks to both rocket and fireworks. The rocket's wick was 4 in. long.

"Oh Mr. Rotgocks! Come over and lemme explain this! Both wicks burn at a constant rate of 2 ips. You light both at the same time and get away. Like I said, the fireworks will explode at maximum height. People will be talking about this show for months to come!"

Neglect air resistance. How much wick *should* Kaboom have used for the fireworks?

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 171

— You're not the type to go off on a tangent, if you answered **2.88**. Here's the angle:

We know each side of the smaller triangles is 5. We can solve for  $d$ , the rod diameter, by drawing a series of right triangles (see diagram) and using the formula for a right triangle,  $a^2 + b^2 = c^2$

First, solve for  $b$ .

$$(2.5)^2 + b^2 = 25$$

$$b = \sqrt{25 - 6.25}$$

$$b = 4.33$$

Now we can solve for the radius of the circle using another right triangle:

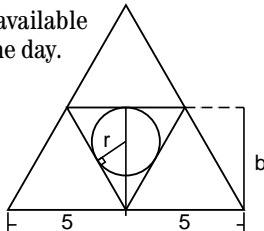
$$r^2 + (2.5)^2 = (4.33 - r)^2$$

$$r^2 + 6.25 = 18.75 - 8.66r + r^2$$

$$1.44 = r$$

$$d = 2r = 2.88$$

Bluff was unavailable for the rest of the day.



### Contest winner

— Congratulations to James Lequar of Forney, Texas, who won our March contest by having his name drawn from the 29 contestants who answered correctly

out of a total of 39 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.