FUN WITH FUNDAMENTALS

Letter of intent

Problem 184 — Reading between the lines is sometimes easier than reading under them, as this month's problem by Gary Baylor of Yardley, Pa., demonstrates.

It was 10:00 p.m. and the chase was on! The agile spy bounded over fences and low rooftops as a pack of policemen, detectives, and representatives of various government agencies huffed after him. Too late! The spy plunged into a well-known embassy and into diplomatic immunity.

Detective Inspector Schnoop wrung his hands and muttered an oath. A certain nation's latest international scandal would certainly be the top story of the hour. A scrap of paper dropped by the spy indicated he was about to alert the media. On the paper were the figures:


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  ABC
  CBS
+ NBC
 NEWS
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The chase had been the culmination of a six-month-long investigation. The embassy had been funding a secret group of agitators who had been traced to four empty houses in a seldom-traveled street. Unfortunately, the police had been unable to ascertain which houses. The numbers on the street ran from 123 to 1075.

Schnoop suddenly stopped in his tracks and stared at the scrap in amazement.

Let each letter stand for a unique number between 0 and 7, inclusive — no 8s or 9s. What were the house numbers? Will Schnoop and his cracking of the case be the highlight of the 11:00 p.m. news instead?

Send your answer to:

Fun With Fundamentals
POWER TRANSMISSION DESIGN
1100 Superior Ave.
Cleveland, OH 44114-2543

Deadline is July 10. Good luck!

Technical consultant, Jack Couillard, Menasha, Wis.

Solution to last month's problem 183 — You know whose side to take if you answered **1/5 ft^2**. Here's the not-so-silver lining:

The following is one of the several ways to solve this problem.

Consider the center large square and its right-hand neighbor. Since triangle *ABC* is a right triangle,

$$\left(\overline{DE}\right)^2 + x^2 = \left(33\right)^2 = 1{,}089$$

$$\left(\overline{AB}\right)^2 + x^2 = \left(42\right)^2 = 1{,}764$$

We can find the area of the diamond by finding the areas of the four small triangles that surround it and subtracting their total from the area of the 1 in. × 1 in. square. If we can show that triangle *ADE* is a right triangle, we solve for the area using similar triangles:

$$F = V\left(\rho_{air} - \rho_{hyd}\right) - \left(W_{wf} + W_b\right) = 166$$

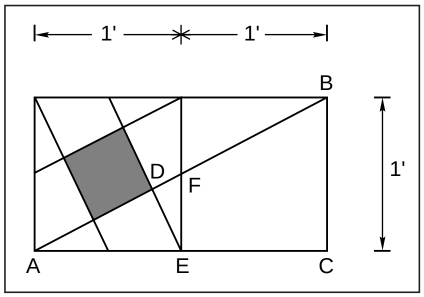
By similar triangles, ⟨*DEF* is also 26.6 deg.

$$d = \sqrt[3]{\frac{6V}{\pi}} = 27.6 \text{ ft}$$

⟨*ABC* is 63.5 deg

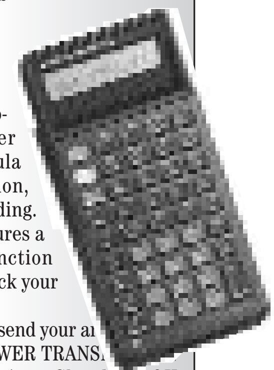
Since the three angles of a triangle must equal 180 deg, ⟨ *ADE* is 90 deg, and triangle *ADE* is a right triangle. We can use ratios and known values to determine its area.

$$v = \sqrt{\frac{2F}{C_D \rho_{air} d^2}} = 5.2 \text{ fps}$$



Contest winner — Congratulations to Jerry Arts of Shreveport, La., who won our April contest by having his name drawn from the 11 contestants who answered correctly out of a total of 13 entrants 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.

There are four of these triangles inside the center square. The area they occupy is 4 × (1/5) ft^2. Therefore, the area of the diamond is 1 ft^2 – 4/5 ft^2, or 1/5 ft^2.

Ross's ideas proves to be off-color!