

## Assorted Difficulties

*This may look familiar, but...*

### THIS ISSUE'S PUZZLES

**Puzzle 1.** It's the year 2054. The Interstellar Academy of Actuaries is holding its annual meeting on Mars. A group of seven actuaries are shmoozing around a table and discussing the latest advances in interstellar instantaneous projection techniques. Of course these actuaries, advocates of the "computer-less office" philosophy developed in the 30's, have had bioengineered computer chip brain implants that facilitate complex mental calculations, previously doable on mathematical calculators.

The actuaries decide it would be useful to know the set of their seven salaries. However, they do not want anybody to know the salary or salary rankings of anybody else.

They have no paper or writing implements—how could they determine the seven salaries?

**Puzzle 2.** One of the actuaries suggests a variation. They know that one of them earns a significantly higher salary than the others. Although they do not know who receives such maximum, they would like to determine the maximum salary (rounded to nearest thousand dollar increment) without anybody finding any of the other salaries or salary rankings of others. How could they do this?

Note: The solvers list will include solvers of either of these puzzles. Thank you Virginia Young and David Promislow for suggesting the problems on which these puzzles are based.

Please submit your solution via email to

### EASY AS 1,2,3

3, 3, 5, 4, 4, 3, 5, 5, 4, 3, ?, . . .

Can you determine the unknown term in the above sequence?

[Hint: it is not any of the previous digits.]

See answer, page 87. Please don't submit answers.



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Puzzles@aol.com or by mail to: PUZZLES, 17 Ravine Rd., Great Neck, NY 11023. Please submit answers as soon as possible to make the solvers list. Please send any ideas, and new or old favorite puzzles that you think may be useful for future issues, to the same address or e-mail.

### LAST ISSUE'S PUZZLE:

**Fair Foul Play.** A, B, and C take basketball foul shots one at a time in order A, B, C, A, B, C, A . . .

The first one to sink a foul shot wins. B sinks 30% of his foul shots. It turns out the game is completely fair—i.e. each has an equal chance of winning. What percentage of foul shots does A sink? What percentage does C sink?

Suppose fourth player D, who sinks 50% of his foul shots, wants to play such that all four would have an equal chance of winning. What method will work to make each have an equal chance of winning?

### Answer:

- A=3/13 or approximately 23.08%
- C= 3/7 or approximately 42.86%
- For D—simply shoot A, B, C, D, D, A, B, C, D, D, A . . . Winner is first to make the shot.

**Explanation:** Setting this up as an infinite series, or alternatively by realizing that it is just necessary to make each round "fair" we obtain:

Let  $A = P(\text{A making shot})$ , similarly for B and C

$P(\text{A making shot}) = P(\text{A missing}) \times P(\text{B making shot}) = P(\text{A missing}) \times P(\text{B missing}) \times P(\text{C making shot})$

Thus,  $A = (1-A) \times .3$  thus  $A = 3/13$

And,  $B = (1-B) \times C$  thus  $C = 3/7$

Note progression—3/13, 3/10, 3/7. Similarly, one obtains the result that a fourth shooter would need probability of 3/4 in order to be "fair." This is obtained by having D shoot twice and having to make either shot.

Note, variations from some readers on D's solution included: 1) D is in a rush. Have D go first and shoot twice. If he makes both shots he wins and everybody can go home. If he loses he no longer plays and goes home. 2) D has a bit more time to kill. Play A, B, C, A, B, C . . . After the first one makes the shot, have D shoot twice—D wins if he makes both shots, otherwise person who made the shot wins.

**November/December Solvers:** R. Bartholomew (in first40).

**January/February Solvers:** J. Abraham, S. Alpert, S. Altschuld, J. Barr, R. Bartholomew, M. Belfatti, C. Bergen, F. Bernardi, R. Bottelli, B. Butsic, B. Byrne, D. Cantor, L. Cappellano, W. Carroll, R. Conger, E.W. Crane, B. Creveling, E. Cruz, D. DeKeizer, R. Diefenbach, L. Dyrland, M. Cebula, J. Edmondson, G. Engel, D. Engelmeier, M. Evans, M. Failor, B. Feldman, T. Fitzgibbons, C. FitzSimons, J. Francis, Y. Fridman, B. Gabriel, S. Gallancy, R. Giambo, G. Gilis, M. Glickman, J. Gold, M. Gueron, D. Harms, D. Harris, T. Haynes, M. Henley, J. Herder, K. Houck, H. Ingraham, C. Jackson, F. Karlinski, D. Karo, J. Kawczak, D. Kidwell, R. Klein, S. Koca, R. Kollmar, E.W. Kra, S. Kuester, C. Kwok, W. Leisinger, C. Lemming, H. Luber, B. Lundeen, M. Lynch, J. Marshall, D. Mautin, H.L. Michelson, B. Miller, B. Montigney, C. Najin, J. Naylor, D. Noga, R. Nordquist, D. Oakden, D. Onnen, G. Papazicos, J. Peck, S. Peeples, J. Pelant, P. Perl, C. Platania, D. Promislow, H. Ramsey, D. Raskin, G. Rosen, T. Roust, R. Schauder, G. Scruton, E. Sondergeld, A. Spooner, R. Stokes, T. Torelli, E.W. Torrance, K. Trapp, D. Uhland, S. Vincent, Z. Wadia, R. Weishaar, T. Wen, M. Wickwire, T. Wilson, P. Winnett, S. Witt, K. Yen, J. Young, T. Zillmer, D. Zimmerman.