



The THIRTIETH
Sean Kelly
Brandon McPhail

Image courtesy of University
of Pennsylvania Museum,
<http://www.museum.upenn.edu/>

Tsk tsk, the Admissions Office

In a fit of cruelty, the Admissions Office decides it needs to weed out some applicants. To every prospective student, they give notice that in order to be eligible for acceptance, he or she must compete in a series of expository competitions. Reed will send out a number of short essay questions, which they must quickly answer and send back. After each round, a person receives either a good score of a points, or a poor score of b points (a and b are positive integers with a greater than b). The first person to get *exactly* 58 points wins.

After the first few rounds, one astute applicant informs Reed that, in fact, it is impossible to ever score 58 points, given a and b . They also notice that there are exactly thirty-five non-attainable scores, including 58. Find a and b .

Source: Putnam Competition, 1971
Even Aristotle could do this.

The One

One day an extremely bored student began writing down the positive integers in order: 1, 2, 3, ... When she got to 20 she noticed that she had used the digit 1 twelve times (once each for 1, 10, 12, 13, ..., 19 and twice for 11). She asked herself if there was some number n (greater than 1) such that in writing down the integers from 1 to n she would have used the digit 1 exactly n times.

1. Is there such an n ?
2. If so, is there a largest such n ?
3. What if the digit 1 is replaced by another digit?
4. What if we work in a number base other than base 10?

Puzzle by Les Reid
Even Kant could do this.

MU DIRU WNI~~N~~ECI VGI EG FDZ, ZGX KDE MGIL FXRR~~N~~EC RWU FXBBPU
FDCU RGCURWUI WYUIZ MUIIL. NRQD CIRDR MDZ RG RIUIR
PDI~~N~~UIQ. ZGXPP WDN~~U~~ RWU KWDEK~~U~~ RG CUR ZGXI MGIL FXPP~~N~~QWUI
DET PUDIE RUS. RG DFFPZ, QUIET QGAU MGHTQ RG RWU UADNP
DFTIUQQ DR RWU JGRRG~~A~~ GV RW~~N~~Q FDCU.

So what if Freud can do it??

- Even Freud could do this.
- Even Pythagoras could do this.
- Even Aristotle could do this.
- Even Kant could do this.
- Even Ray Mayer could do this.

- Easy
- Not easy
- More challenging
- This is a hard problem.
- Go ask him for help.

Think you know the answer?
For more info on these puzzles, go to
<http://www.reed.edu/~mcphailb/quest/>

EGRDLUZVGIRW
UFXBBPUQNPZ

Questions? Blitz: puzzles@reed.edu