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Math Club Teaser #64

September 2, 2011
(due September 9, 2011)

Solution

There are $2^5 = 32$ different ways to answer five yes-no questions.

Correct answers	5	4	3	2	1	0
# of combinations	1	5	10	10	5	1

The only way to have six candidates with the same number of correct answers is if they had either 2 or 3 correct. But 2 is not an option, as that would leave only $5 + 1 = 6$ exams with fewer correct answers, and there are seven candidates left.

Of the three failing exams shown, the second cannot have all three of questions 2, 3, 4 wrong. Otherwise, the third one would have those three right. Similarly, the third cannot have all of those questions wrong. This means that one of them had one right, and the other had two right among questions 2, 3, 4. But then they had questions 1 and 5 wrong. We conclude that the answers to 1 and 5 are `No` and `No`.

A similar argument using the first and third exams shown gives that the correct answers to 3 and 4 are `No` and `Yes`. Now, the second exam shown has questions 3 and 4 right, so its answer to 2 is wrong. Now we have all the correct answers:

`No, Yes, No, Yes, No`

Solved by:

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