TEACHING BRIEFS...The NBA Draft Lottery
by Martin Levinton

Not long ago the National Basketball Association had a simple system to help improve the teams which won the fewest games the previous year. The team with the worst record would get the first choice of the college basketball players eligible to play professional ball, the team with the next to worst record would get the second choice, and so on. But under that system the poorer teams might actually gain an advantage by losing more games. Realizing this, and wanting to maintain public confidence, the NBA changed the system of selecting new players.

At present, eleven teams in the NBA do not reach the championship playoffs each year. The other teams still choose their new players in reverse order according to their records the previous year (after the eleven non-playoff teams choose theirs), but the system for those eleven teams is as follows:

1. The eleven teams are ranked in reverse order and each is given a different number of ping-pong balls with its logo; the worst team gets 11 ping-pong balls, the next to worst, 10, and so on.
2. The first three picks are done by lottery and the fourth through eleventh picks proceed inversely by record. This insures that the very worst teams are still guaranteed relatively good picks.
3. Ping-pong balls are not replaced after chosen, and if a ball designating a team already selected in the lottery is drawn, it is disregarded.

Here is a list in order of the eleven teams with the worst records last year; #1 was worst.

1. Minnesota Timberwolves
2. Orlando Magic
3. Dallas Mavericks
4. Denver Nuggets
5. Washington Bullets
6. Sacramento Kings
7. Milwaukee Bucks
8. Charlotte Hornets
9. Philadelphia 76ers
10. Atlanta Hawks
11. Houston Rockets

Under the new system, if Denver (#4) had gotten lucky and obtained the first pick, Sacramento (#6) the second pick, and Minnesota (#1) the third pick then the other eight teams would have chosen basketball players in the following order: #2, #3, #5, #7, #8, #9, #10, #11.

TEACHING BRIEFS...The 12 Days OF XMAS
by Georgeanna Fernandez

Every December I put up a bulletin board which includes Pascal's triangle and the old song "The Twelve Days of Christmas." The major question I ask is Question 1: *"How many gifts were given altogether?"* I clarify that a "partridge in a pear tree" is one gift. I also ask Question 2: *"How many gifts were given on the fifth day?"* If you remember, the song says "five golden rings, four calling birds, three french hens, two turtle doves and a partridge in a pear tree." This is not the same as Question 3: *"How many gifts had been received by the fifth day?"* You can also ask Question 4: *"Which day had the most gifts and how many?"* or Question 5: *"How many golden rings?"*

The answer to most of these questions are in the diagonals of Pascal's triangle (see below), where each entry is the sum of the two entries immediately above it. Construct Pascal's triangle up to at least the row that starts 1, 14, 91, 364 ... Next to the "ones" diagonal is the "counting number" diagonal which represents the days or the number of new gifts for any particular day. For example, day 7 is 7 swans a-swimming. The next diagonal represents the total of gifts received in one particular day. For example, the answer to Question 2 is $5 + 4 + 3 + 2 + 1 = 15$, which is the number below and to the left of 5 if you are on the right side of the triangle. Also, for Question 4, the best day is 12, with 78 gifts, again below and to the left of 12.

The diagonal that contains 1, 4, 10, 20 ... is the cumulative total. The answer to Question 3 is 35, the fifth entry in that diagonal. In simpler terms, at the end of day 2 you had 1 old plus $3 = (2 + 1)$ new for a total of 4, at the end of day 3 you had 4 old plus $6 = (3 + 2 + 1)$ new for a total of 10, and

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                              1
                            1   1
                          1   2   1
                        1   3   3   1
                      1   4   6   4   1
                    1   5  10  10   5   1
                  1   6  15  20  15   6   1
                1   7  21  35  35  21   7   1
              1   8  28  56  70  56  28   8   1
            1   9  36  84 126 126  84  36   9   1
          1  10  45 120 210 252 210 120  45  10   1
        1  11  55 165 330 462 462 330 165  56  11   1
      1  12  66 220 495 792 924 792 495 220  66  12  1
    1  13  78 286 715 ..................... 715 286  78  13  1
  1  14  91 364 ....................... 364  91  14  1
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