MEDIA clips

So You Picked the Final Four? Join the Club

What's a Final Four without a George Mason or another plucky party crasher? What's an N.C.A.A. men's basketball tournament without a little-known team that is all guile and grit and topples an elite team to capture America's heart?

What's March without the Madness?

It's, well, predictable. With top-seeded Florida and Ohio State meeting second-seeded U.C.L.A. and Georgetown next weekend in Atlanta, this will be the first Final Four since 1993 with no team seeded lower than No. 2.

Don't believe us? Last year at this time, of the 3.1 million entries in ESPN.com's bracket pool, only four chose the correct Final Four teams. This year [2007], 161,869 of 3.3 million entries have the [Florida] Gators, the [Ohio State] Buckeyes, the [U.C.L.A.] Bruins and the [Georgetown] Hoyas still alive.

Source: Pete Thamel, "So You Picked the Final Four? Join the Club," NYT.com, March 26, 2007. www.nytimes.com/2007/03/26/sports/ncaabasketball/26ncaa.html?ex=1177041600&en=7c3499452e2403bc&ei=5070.

Every March, men's college basketball teams compete in the NCAA tournament. Sixty-five teams participate, with two teams vying for the 64th slot. The 64 teams are divided into four 16-team regions, in which they are seeded 1 through 16. The winning team in each region advances to the Final Four. Fans participate by submitting predicted outcomes for the 64 teams to pools like that run by ESPN.

1. For any year, if a fan randomly selects from among the 64 teams in the tournament, what is the probability of correctly picking the Final Four?

2. (*a*) If all fans who entered the ESPN pool in 2006 had picked the Final Four randomly, how many would have picked the Final Four correctly?
(*b*) Is that number greater or less than the number who did pick the Final Four correctly?

3. (*a*) If all fans who entered the ESPN pool in 2007 had picked the Final Four randomly, how many would have picked the Final Four correctly?
(*b*) Is that number greater or less than the number who did pick the Final Four correctly?

4. Referring to answers 2 and 3, what advice would you give to a fan who wants to pick the Final Four correctly?

In 2006, the teams in the Final Four were the number 2, 3, 4, and 11 seeds in their respective regions. The University of Florida, a number 3 seed, won the tournament. No team seeded lower than 11 has ever made the Final Four. In 2007, the teams in the Final Four were number 1, 1, 2, and 2 seeds. Florida, a number 1 seed, won the tournament again.

5. Consider the 2008 tournament.
(*a*) What number seeds were the Final Four teams?
(*b*) How many fans entered the ESPN pool? How many correctly chose the Final Four?

6. How did the defending national champions, the University of Florida, do?

"Media Clips" aims to offer readers contemporary, authentic applications of quantitative reasoning that are based on print or electronic media. We encourage submissions that include questions as well as clips. Submissions must include a complete citation of the source, along with the full text of the cited material. If possible, submissions should also include a copy of the actual clip. Please send submissions to "Media Clips" editors.

Edited by ***Margaret Cibes***
cibes@hartford.edu
Hillyer College
University of Hartford
West Hartford, CT 06117

James Greenwood
JHGreenwoodJr@gmail.com
Hillyer College (retired)
University of Hartford
West Hartford, CT 06117

Does It Still Make Sense to Keep Making Cents?

…. Penny proponents, you're going to need some backup.

War has been waged, yet again, on the copper coin (actually, 97.5 percent zinc in a 2.5 percent copper coating). Five years after his first attempt to stamp out the penny, U.S. Rep. Jim Kolbe is taking another crack. And with metal prices soaring since 2001, the Republican from Arizona is feeling lucky. He says it costs 1.4 cents to produce a penny, and estimates that minting the coins will amount to a $20 million waste this year.

… [N]ever mind that it costs 5.73 cents to produce a nickel—a coin that has eluded scrutiny.

Kolbe's penny solution: Round to the nearest nickel, down for cash transactions ending in 1, 2, 6, and 7 cents and up for those ending in 3, 4, 8 and 9.

… The pro-penny lobby contends that dropping the coin would lead to price increases….

… [A] study from the National Association of Convenience Stores … says futzing with pennies at the register tacks two seconds onto each cash transaction. Using that math, the group figures that's four wasted hours per person per year. And because time is money, it figures that amounts to $60 a person and $15 billion nationwide.

Source: Joann Klimkiewicz, *The Hartford Courant*, August 22, 2006, pp. D1, D4.

The U.S. Treasury purchases coins from the U.S. Mint at face value. Suppose that it costs 1.4 cents for the U.S. Mint to produce a penny and that minting pennies would have resulted in a $20 million loss to the U.S. Mint in 2006.

1. How many pennies would have been produced in 2006?

2. What would have been the total cost of minting pennies in 2006?

3. The U.S. Mint (www.usmint.gov) reports that 8,234,000,000 pennies were produced in 2006. If this resulted in a $20 million loss to the mint in 2006, what was the cost of producing a penny?

Kolbe suggests that we could round down to the nearest nickel for cash transactions ending in 1, 2, 6, and 7 cents and that we could round up to the nearest nickel for cash transactions ending in 3, 4, 8, and 9 cents.

4. Determine the rounded figures for cash transactions of $14.96 and $14.98.

5. For what cash transactions would Kolbe's proposed solution round cash transactions down to 0 dollars? How might this lead to price increases?

The National Association of Convenience Stores appears to believe that the use of pennies is time consuming and expensive. Assume that the study refers to time lost by cashiers.

6. According to the association's figures, how many cash transactions involving pennies does the average cashier make during one year? During one day?

7. How much time might the average cashier save in one day?

8. According to the association's figures, what is the cost of this loss of time per cash transaction?

9. According to the association's figures, how many cashiers are there nationwide? Is this number of cashiers realistic?

MEDIA CLIPS solutions

"March Madness" answers

1. If a fan chooses teams randomly, the probability of correctly picking the Final Four is 1 in 65,536. The probability of correctly picking a regional winner is

$$\frac{1 \text{ team}}{16 \text{ teams}} = \frac{1}{16}.$$

The probability of correctly picking the four regional winners is

$$\left(\frac{1}{16}\right)^4 = \frac{1}{65{,}536}.$$

2. (*a*) If all fans had picked randomly in 2006, approximately 47 would have correctly picked the Final Four. Solve

$$\frac{x \text{ entries}}{3{,}100{,}000 \text{ entries}} = \frac{1}{65{,}536}$$

to get $x \approx 47.302$.
(*b*) This number (47 fans) is greater than the 4 fans who did pick correctly in 2006.

3. (*a*) If all fans had picked randomly in 2007, approximately 50 fans would have correctly picked the Final Four. Solve

$$\frac{x \text{ entries}}{3{,}300{,}000 \text{ entries}} = \frac{1}{65{,}536}$$

to get $x \approx 50.354$.
(*b*) This number (50 fans) is less than the 161,869 fans who picked correctly in 2007.

4. From answers 2 and 3, we see that all fans picking the Final Four randomly would have constituted a larger proportion of fans who picked the correct results in 2006 but a smaller proportion of fans who picked the correct results in 2007. In games of pure chance, in which all outcomes are equally likely, random selection cannot be improved on. In all other games, any knowledge available should always be applied, although there is no guarantee of an optimal outcome in any single game.

5–6. Use the Internet or other sources to find the answers.

"Do Cents Make Sense?" answers

1. About 5 billion pennies would have been produced in 2006:
1.4 cents – 1.0 cents = 0.4 cents = \$0.004
\$20 million ÷ (\$0.004 per penny) = 5,000 million pennies

2. The total cost of minting pennies in 2006 would have been about \$70 million.
5 billion pennies • (\$0.014 per penny) = \$0.07 billion

3. The cost of producing a penny would have been about \$0.0124.
Loss per penny = \$20 million ÷ 8,234 million pennies ≈ \$0.0024 per penny
Cost of a penny = \$0.01 + \$0.0024 = \$0.0124

4. The figures would round as follows: \$14.95 and \$15.00.

5. Cash transactions of \$0.01 or \$0.02 would round down to 0 dollars.

Answers will vary. For example, under Kolbe's proposal, items priced at 1 cent or 2 cents would be free, so retailers would probably increase the price for such items to at least a nickel.

6. The average cashier handles about 7,200 cash transactions involving pennies during one year and about 20 cash transactions involving pennies during one day, assuming a work year of 365 days.

$$\frac{4 \text{ hr. per person per yr.}}{2 \text{ sec. per cash transaction}} \cdot \frac{60 \text{ min.}}{1 \text{ hr.}} \cdot \frac{60 \text{ sec.}}{1 \text{ min.}}$$

$$= 7{,}200 \text{ cash transactions per person per year}$$

$$\frac{7{,}200 \text{ cash transactions}}{1 \text{ yr.}} \cdot \frac{1 \text{ yr.}}{365 \text{ days}}$$

$$\approx 19.7 \text{ cash transactions per day}$$

7. The average cashier might save about 40 seconds, or less than a minute, each day.

$$\frac{2 \text{ sec.}}{1 \text{ transaction}} \cdot \frac{20 \text{ transactions}}{1 \text{ day}}$$

$$= 40 \text{ sec. per day}$$

8. The cost per cash transaction is about \$0.008, or almost a penny, per transaction:

$$\frac{\$60 \text{ per cashier}}{7{,}200 \text{ cash transactions per cashier}}$$

$$\approx \$0.008 \text{ per cash transaction}$$

9. There would be about 250 million cashiers:

$$\frac{\$15 \text{ billion}}{\$60 \text{ per cashier}} = 250 \text{ million cashiers}$$

This number does not appear to be realistic. According to the U.S. Census Bureau, the U.S. population was about 300 million in 2005. Of this population, only about 200 million were 15 to 65 years old, and probably only a fraction of them worked as cashiers. ∞