

Probability

3.6 Multiplicative Rule of Probability

1. A Pew Research Center survey conducted Dec. 6-19, 2011 surveyed 2,048 adults nationwide, including 808 young adults (ages 18 to 34). Among the survey participants more than eight-in-ten (82%) said finding a job is harder for young adults today than it was for their parents' generation. And at least seven-in-ten say it's harder now to save for the future (75%), pay for college (71%) or buy a home (69%). Using these results, what is the probability that a randomly selected group of four adults would say that it is harder today for young adults today to find a job?
2. The Pew Research Center also included the following results: Among all 18- to 34-year-olds, fully half (49%) say they have taken a job they didn't want just to pay the bills, with 24% saying they have taken an unpaid job to gain work experience. And more than one-third (35%) say that, as a result of the poor economy, they have gone back to school. Their personal lives have also been affected: 31% have postponed either getting married or having a baby (22% say they have postponed having a baby and 20% have put off getting married). One-in-four (24%) say they have moved back in with their parents after living on their own. Use the survey results to estimate the probability that three randomly selected young adults all have been forced to moved back home because of the economy.
3. Each day a cupcake store in downtown Miami places a coupon for a free dozen cupcakes printed inside the paper cupcake wrappers of three of its cupcakes. The owner is concerned that one of her employees has told a friend which cupcakes have the coupons because a customer selected three cupcakes for purchase and chose all three of the winners. If the case contained 37 cupcakes of which three were winners, what is the probability somebody would get lucky and randomly choose the three cupcakes with the coupons?
4. A bag of marbles has 6 red marbles, 4 blue marbles, and 7 white marbles. What is the probability that two randomly selected marbles without replacement will both be white?

Answers:

1. $P(4HFW) = 0.82^4 \approx 0.452$

2. $P(3MBH) = 0.24^3 \approx 0.0138$

3. $P(3CC) = \frac{3}{37} * \frac{2}{36} * \frac{1}{35} \approx 0.000129$

This probability is so small it seems that the customer had a way to know which cupcakes had the coupons.

4. $P(2W) = \frac{7}{17} * \frac{6}{16} \approx 0.154$