

A couple plans to have children until they have a girl or until they have 3 kids, whichever comes first. What is the probability that they will have 3 children without having a girl?

- ① What's the probability that a couple will have 3 kids without a girl?

outcomes: G, BG, BBG, BBB

Each child has a .5 chance of being a girl and a .5 chance of being a boy.

- ② We will flip a coin with Heads = Boy and Tails = Girl. We will flip until we get a T or 3 heads whichever comes 1st. We will repeat this 20 times. Then we will record the # of times we got 3 heads.

- ③
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|---------|---------|---------|--------|--------|
| 1. T | 2. HT | 3. HHH | 4. HHT | 5. HHH |
| 6. T | 7. HT | 8. HT | 9. HT | 10. TT |
| 11. HHT | 12. HHT | 13. HHH | 14. T | 15. HT |
| 16. HHH | 17. T | 18. T | 19. T | 20. T |

- ④ In these 20 repetitions we got 4 times with 3 boys and 0 girls.

$$\frac{4}{20} = \frac{1}{5} = 20\% = .2$$

Based on our simulation, we would estimate that about 20% of the time a couple will have 3 boys and no girl.