

Simulated Coins

In this Task you will investigate the sampling distribution and model for the proportion of heads that may show up when a coin is tossed repeatedly. Toss the coins if you want, but it's much easier and faster to do a simulation!

1. Set up the calculator's or random number generator to simulate tossing a coin 25 times. (The easiest way to do this is to generate 0's and 1's with equal probability, with 1 representing heads. By adding up all the 0's and 1's you can effectively count the number of heads. Dividing that count by the number of tosses will get you \hat{p} , the sample proportion of heads. The complete calculator command would be `sum(randInt(0,1,25))/25`.)
2. Run 20 trials, recording all the sample proportions and make a histogram of the results.
3. Repeat your simulation, this time tossing the coin 100 times. Again make a histogram of twenty sample proportions.
4. Compare your two distributions of the proportions of heads observed in your simulations.
5. What should have happened? Describe the sampling model for 100 tosses.
6. Compare the actual distribution of your twenty sample proportions for 100 tosses to what the sampling model predicts.
7. Describe how your results might differ if you had run 1000 trials of the simulation instead of only 20.