54. We can toss 10 coins (or a single coin 10 times) to simulate 10 children being born. Let heads = girl, and tails = boy (or vice versa).

Then, repeat that experiment (tossing 10 coins) hundreds of times. Observe how many of those repetitions include 9 heads and one tail, which means getting 9 girls and one boy. The relative frequency is the number of times you got 9 heads and one tail divided by the number of repetitions, and gives you an approximate value for the probability of 9 girls and 1 boy in 10 births.

Statistics

55. Cindy's sampling method is biased. She chose students from her class, which means that all the other students in the college didn't have a chance to be selected in her sample. For a sampling method to be unbiased, every member of the population has to have an equal chance of being selected in the sample. (Her method would work if she was only studying the students in her class.)

56. Four people are running for mayor in a town of about 20 000 people. Three polls were conducted, each time asking 150 people who they would vote for. The table shows the results.

	Clark	Taylor	Thomas	Wright	Totals
Poll 1	58	19	61	12	150
Poll 2	68	17	56	9	150
Poll 3	65	22	53	10	150

a. Based on the polls, we can predict Clark to be the winner of the election. He is leading in two of the three polls.

b. To estimate how many votes Thomas will get, use the average percentage of votes he got in the three polls. You can calculate that as ((61 + 56 + 53) ÷ 3)/150 or as (61/150 + 56/150 + 53/150) ÷ 3. Either way, you will get 37.78%. This gives us the estimate that he would get 0.3778 · 8 500 ≈ 3 200 votes in the actual election.

c. We will gauge how much off the estimate of 3 200 votes is by using the individual poll results.
Based on poll 1, we would estimate Thomas to get (61/150) · 8 500 ≈ 3 460 votes.
Based on poll 2, we would estimate Thomas to get (56/150) · 8 500 ≈ 3 170 votes.
Based on poll 3, we would estimate Thomas to get (53/150) · 8 500 ≈ 3 000 votes.

Looking at the highest and lowest numbers (3 000 and 3 460), we can gauge that our estimate of 3 200 votes might be off by a few hundred votes.

57. The total number of people Gabriel surveyed is 45 + 57 + 18 = 120. Of those, 45/120 = 37.5% support building the highway.

This gives us the estimate that 0.375 · 2 120 = 795 ≈ 800 households in the community would support building the highway.

Opinion	Number
Support the highway	45
Do not support it	57
No opinion	18

58. a. Group 1 appears to have lost more weight.

b. Group 1 appears to have a greater variability in the amount of weight lost.

c. The person gained 1 kg.

d. Yes, the method used with group 1 is significantly better than the other.

The median weight loss for Group 1 is 10 kg whereas for Group 2 only a little over 4 kg. The difference in the medians is about 6 kg. The interquartile ranges are about 5 kg for both Groups. The difference in the medians (about 6 kg) is more than one time the interquartile range (about 5 kg), which shows us that the difference is significant.