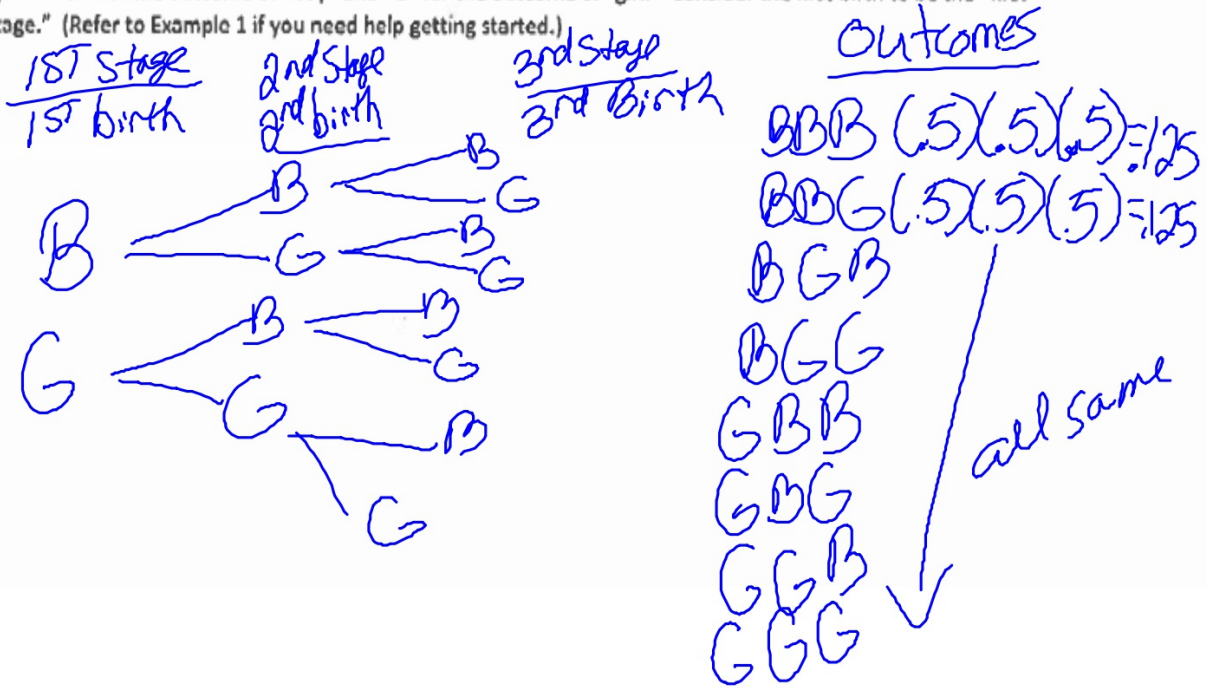


Exercises 7-10: Three Children

A neighboring family just welcomed their third child. It turns out that all 3 of the children in this family are girls, and they are not twins. Suppose that for each birth the probability of a "boy" birth is 0.5, and the probability of a "girl" birth is also 0.5. What are the chances of having 3 girls in a family's first 3 births?

7. Draw a tree diagram showing the eight possible birth outcomes for a family with 3 children (no twins). Use the symbol "B" for the outcome of "boy" and "G" for the outcome of "girl." Consider the first birth to be the "first stage." (Refer to Example 1 if you need help getting started.)



8. Write in the probabilities of each stage's outcomes in the tree diagram you developed above, and determine the probabilities for each of the eight possible birth outcomes for a family with 3 children (no twins).

Since the probability of a boy is 0.5 and the probability of a girl is .5, all 8 outcomes have the same probability of occurring  $\rightarrow .125$ .

9. What is the probability of a family having 3 girls in this situation? Is that greater than or less than the probability of having exactly 2 girls in 3 births?

$$P(GGG) = \frac{1}{8} = .125$$

Less than

$$P(\text{exactly 2 girls}) = \frac{3}{8} = .375$$

3 girls have a smaller probability of occurring than exactly 2 girls.

10. What is the probability of a family of 3 children having at least 1 girl?

$$P(\text{at least 1 G}) = \frac{7}{8} = .875$$