Practice pedigree problems

1. Marfan syndrome is an inherited condition that affects the connective tissue, resulting in unusually long bones and spinal curvature, as well as vision, cardiac, and respiratory problems. The syndrome tends to become increasingly severe over time. The following pedigree shows inheritance of Marfan syndrome in a multigenerational family.

   ![Pedigree Diagram]

   a) How is this syndrome inherited (autosomal recessive, autosomal dominant, X-linked recessive)?

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   b) Can you determine individual II4’s genotype? Explain.

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   c) Individual II1 and II2 are considering having another child. What is the probability that this child will have Marfan syndrome? Explain using a Punnett square.

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2. Humans may have a peaked or smooth hairline. If a man and a woman both have a smooth hairline, none of their children will have peaked hairlines. How is a peaked hairline most likely inherited? Draw a pedigree for a family where one parent and two of three children have a peaked hairline. One of the children with a peaked hairline marries an individual with a smooth hairline. Their children both have a peaked hairline. Identify the genotypes and phenotypes of each individual.