ANSWER KEY.

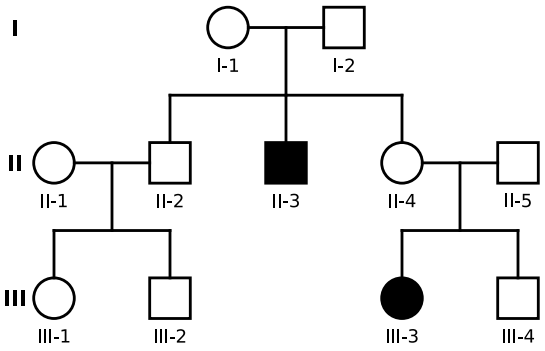
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Pedigrees

Biology | ANSWER KEY

Show your work in the blank space. Write probabilities as fractions. Assume each trait is autosomal.

1. The pedigree shows a trait. Filled symbols are people who have the trait.



(a) Is the trait autosomal dominant or autosomal recessive? Give the clue.

(b) What are the genotypes of II-4 and II-5? Use A and a.

(c) II-4 and II-5 have another child. What is the probability that the child has the trait?

(a) Autosomal recessive. III-3 has the trait but both parents (II-4 and II-5) do not. This cannot happen with a dominant trait.

(b) Both are **Aa**: III-3 is aa, so each parent gave an a, and neither has the trait, so each also has an A.

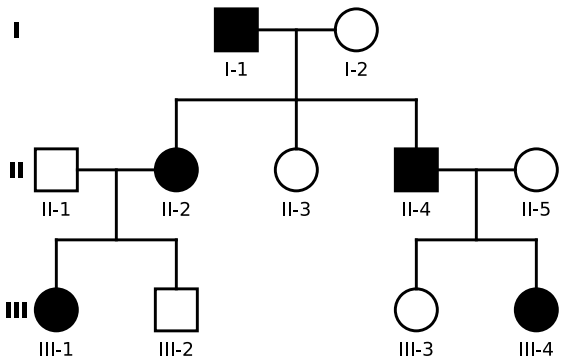
(c) 1/4 (Aa x Aa).

2. Two parents without a trait can have a child with the trait only if the trait is recessive. Explain why.

If the trait were dominant, an affected child would have at least one dominant allele, which must have come from a parent, and that parent would be affected. So the trait must be recessive, and both parents must be carriers (Aa).

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3. A different pedigree shows another trait.



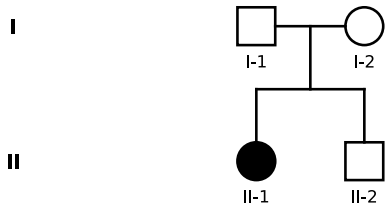
(a) Is the trait autosomal dominant or autosomal recessive? Give the clue.

(b) II-4 (Aa) has a child with a partner who does not have the trait. What is the probability that the child has the trait?

(a) Autosomal dominant. Every person with the trait has a parent with the trait, and it appears in every generation.

(b) 1/2 (Aa x aa).

4. In another family, a recessive trait appears in child II-1. Both parents, I-1 and I-2, do not have it.



(a) What are the genotypes of I-1 and I-2?

(b) What is the probability that II-2, who does not have the trait, is a carrier?

(c) II-2 has a child with a partner who has the trait (aa). What is the probability that the child has the trait?

(a) Both are **Aa**, because II-1 (aa) got an a from each parent.

(b) 2/3. Aa x Aa gives AA, Aa, Aa, aa. II-2 is not aa, so 3 boxes remain and 2 of them are Aa.

(c) 1/3: 2/3 (chance II-2 is Aa) x 1/2 (Aa x aa gives aa) = 1/3.

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