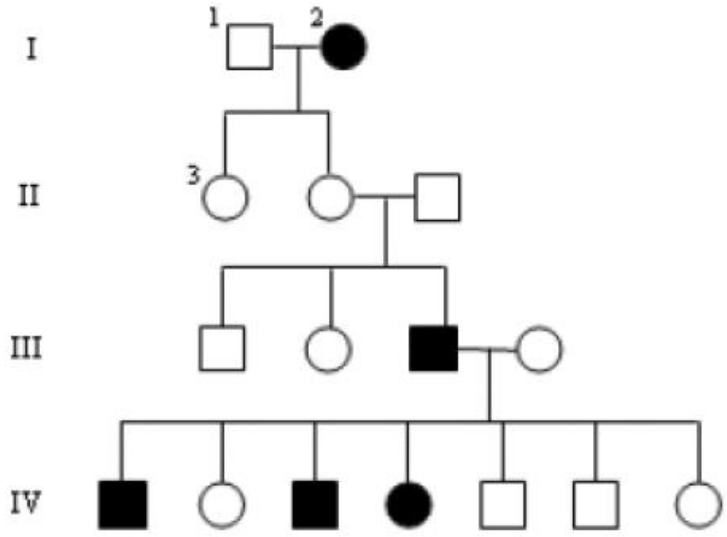
Name: _____ **Class:** _____

Pedigree Worksheet

Answer Key

Interpreting a Human Pedigree

Use the pedigree below to answer 1-5



1. In a pedigree, a square represents a male. If it is darkened he has hemophilia; if clear, he has normal blood clotting.

   a. How many males are there? _____8_____

   b. How many males have hemophilia? _____3____

2. A circle represents a female. If it is darkened, she has hemophilia; if open she is normal.

   a. How many female are there? _____8_____

   b. How many females have hemophilia? _2_____

3. A marriage is indicated by a horizontal line connecting a circle to a square.

   a. How many marriages are there? ____3_____

4. A line perpendicular to a marriage line indicates the offspring. If the line ends with either a circle or a square, the couple had only one child. However, if the line is connected to another horizontal line, then several children were produced, each indicated by a short vertical line connected to the horizontal line. The first child born appears to the left and the last born to the right.

a. How many children did the first couple (couple in row I) have? _2_____

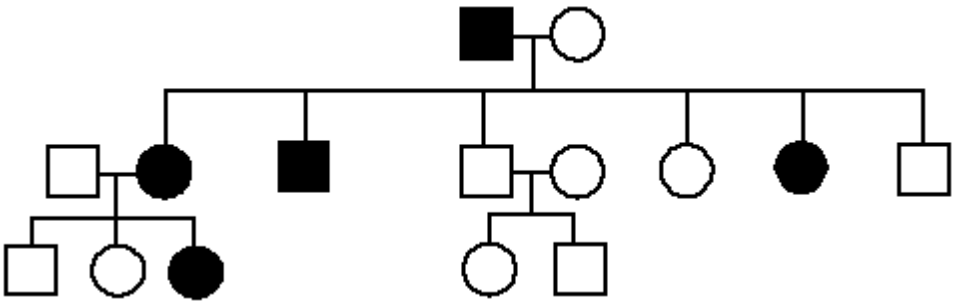
b. How many children did the third couple (couple in row III) have? __7_____

5. Level I represent the first generation, level II represents the second generation.

a. How many generations are there? _____4_____
b. How many members are there in the fourth generation? ____7_____

Use the pedigree below to answer 6-12.

Shaded individuals have Achondroplasia



6. Write the generation on the pedigree numbers (roman numerals).

7. Which members of the family above are afflicted with achondroplasia?
_____5_____

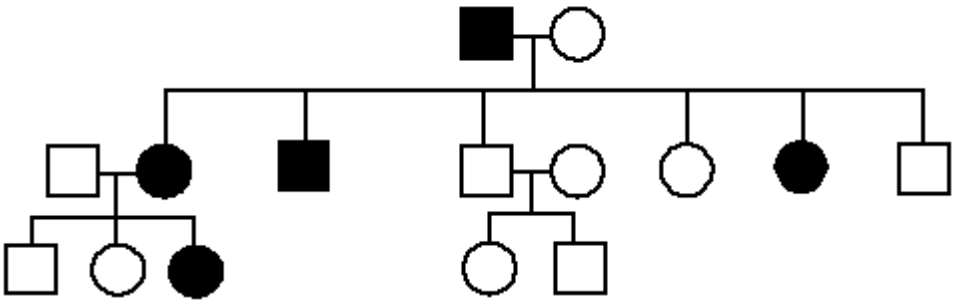
8. There are no carriers for achondroplasia--you either have it or you don't.
With this in mind, is achondroplasia caused by a dominant or recessive trait? ___dominant_____

9. How many children did individuals I-1 and I-2 have? __6_____

10. How many girls did II-1 and II-2 have? __2___ How many have achondroplasia? __1_____

11. How are individuals III-2 and II-4 related? ___II is an aunt to III-2_____ I-2 and III-5? ___I-2 is a grandmother to III-5_____

12. Write the genotypes of each individual on the pedigree.



Generation 1: Aa aa

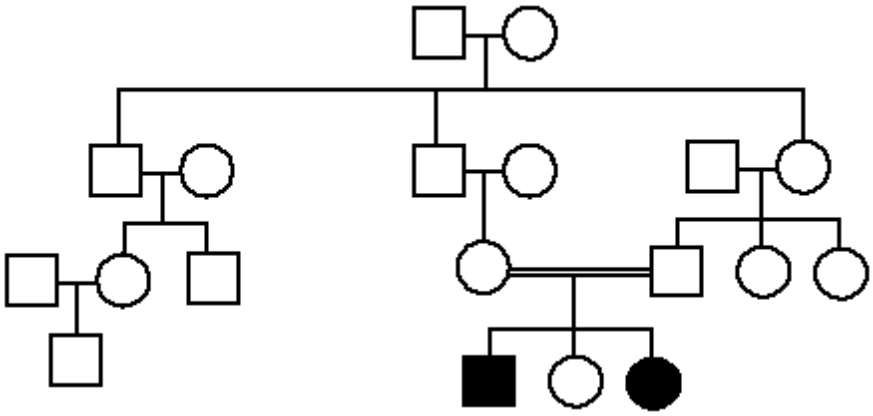
Generation 2:

aa Aa A? aa aa aa A? aa

Generation 3:

aa aa A? aa aa

Use the Pedigree below to answer 13-18.



13. Write the generation on the pedigree numbers (roman numerals).
Four generations, I –IV. Generation I is at the top

The pedigree to the above shows the passing on of Hitchhiker's Thumb in a family. Is this trait dominant or recessive? _____recessive_____

14. How do you know? __They must be carriers if the children get it but the parents did not.__

15. How are individuals III-1 and III-2 related? __married_____

16. Name 2 individuals that have hitchhiker's thumb. _IV-2 and IV-3_____

17. Name 2 individuals that were carriers of hitchhiker's thumb. __III-4 or III-5, I-1 or I-2_____

18. Write the genotypes for each individual on the pedigree. (Answers should be all dominant TT except for the I-1 or I-2 Tt, Tt,
II-3 should be Tt as well as II-6 Tt,
III-4 and III-5 should be Tt
IV, these will show as IV-2 tt IV-4 as tt also.

Determining Inheritance Patterns

19. When working through a pedigree, the first thing you need to do is figure out which characteristic is dominant – the shaded one or the un-shaded one. Then you need to choose a letter (let's use A) and begin assigning genotypes. Remember that recessive individuals are **always** homozygous, so assign their genotypes first. Then go back and look at all of the

dominant individuals. For some, you will only be able to determine one allele of the genotype, so just write the one capital allele followed by a question mark (A?).

a.

Which characteristic is dominant? _____black fur color_____

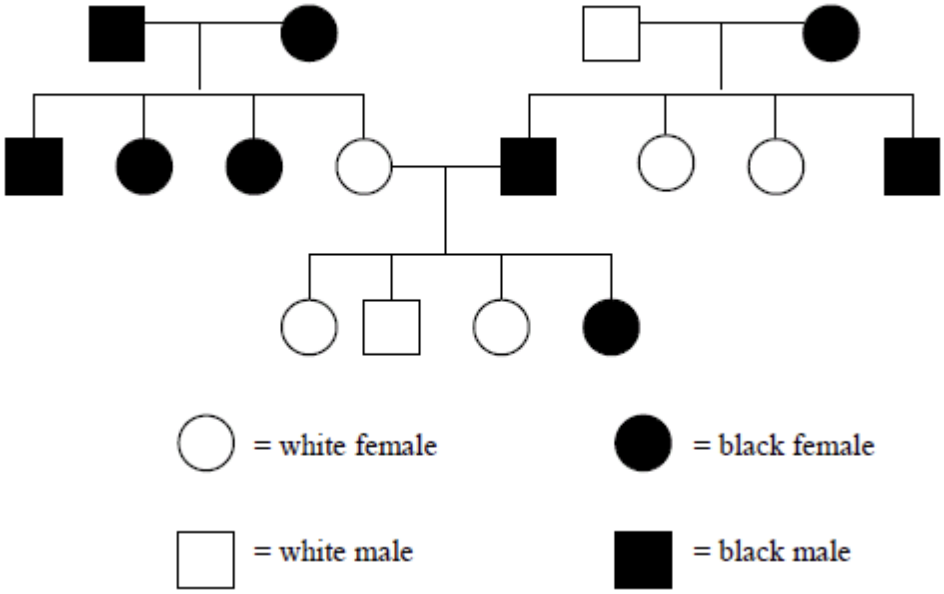
b.

Which characteristic is recessive? _____white fur color_____

c.

Determine the genotypes of all individuals. You will have three "A?". Write your Genotypes beneath each individual.

Fur Color in Mice



I

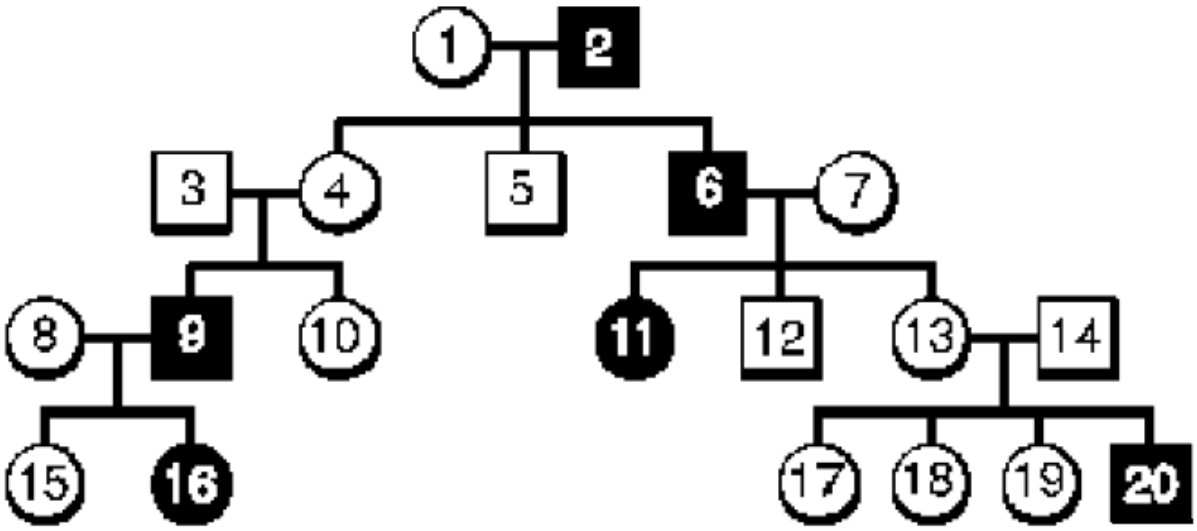
I. Aa Aa aa A?

II.Aa Aa Aa aa Aa aa aa A?

III. aa aa aa A?

20. Is the trait dominant or recessive? ____recessive_____

Write the genotype for each individual (use the letter A)



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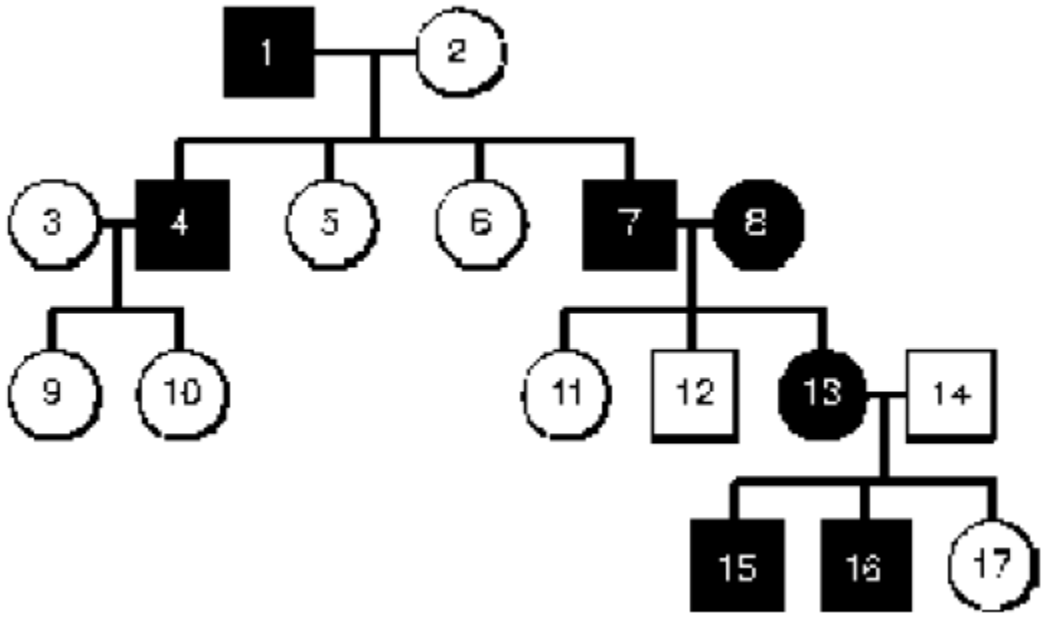
21. Is the trait dominant or recessive? __recessive_____
Write the genotype for each individual (use the letter A)



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Making Conclusions

22. If a child has an autosomal dominant trait, what can you say about the parents?
One of them is at least heterozygous

23. If two parents have an autosomal dominant trait, what can you say about their children?

If they are heterozygous the children will have a 75% chance of inheriting that trait.
If they are homozygous dominant the children will have a 100 % chance of inheriting that trait.

24. If two parents have an autosomal recessive trait, what can you say about their children?
If they display that trait the children will have 100% of that trait.
If they are only carriers then there is a 50% chance they will inherit that trait.

25. If two parents do not have an autosomal recessive trait, what can you say about their children? The children will not have the recessive trait or be carriers.

26. Can autosomal recessive traits skip generations?
Yes, they can be 'expressed' when there are two recessives (one from mom and one from dad)

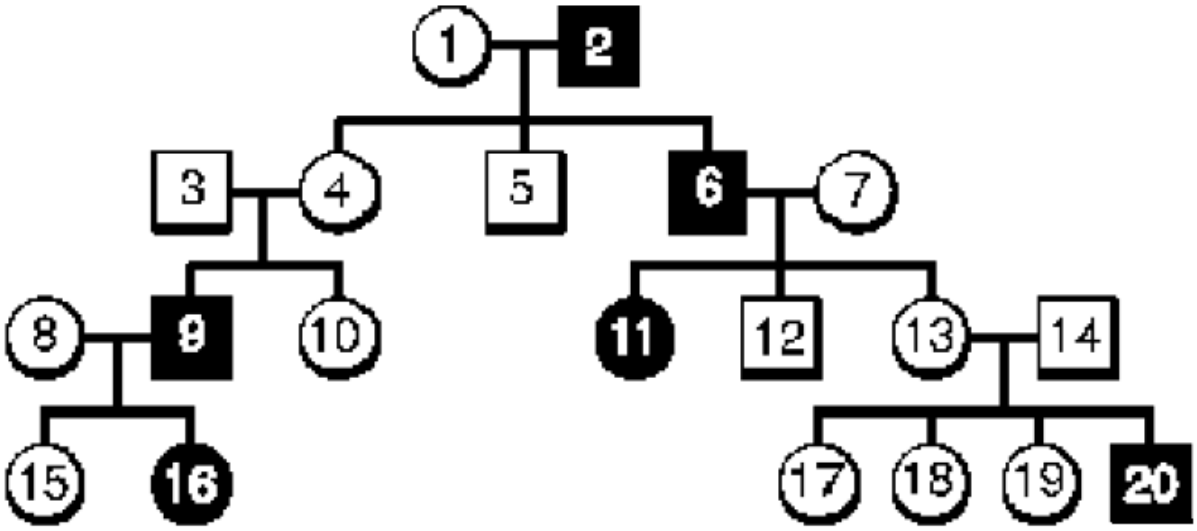
20.

1: Aa 2: aa

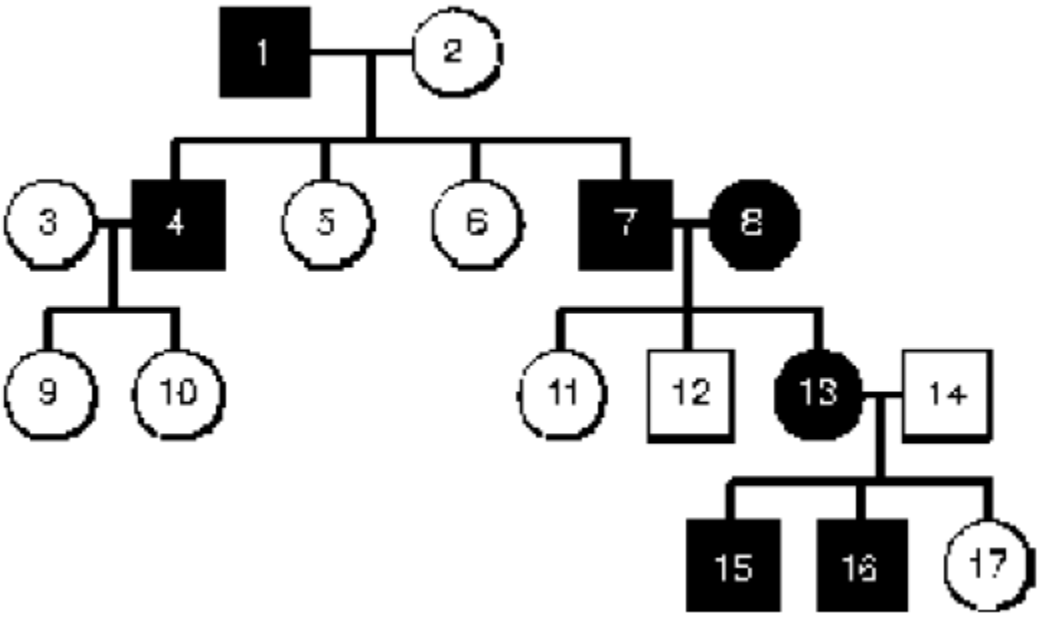
3: Aa 4. Aa 5. A? 6. aa 7. Aa

8. Aa 9. Aa 10. A? 11. aa 12 Aa 13 Aa 14 Aa

15. Aa 16. Aa 17. A? 18. A? 19. A? 20. aa



21.



1. aa 2. Aa

3. AA 4. Aa 5. Aa 6. Aa 7. aa 8. aa

9. A? 10. A? 11. Aa 12. Aa 13. aa 14. Aa

15. aa 16. aa 16. Aa