PSYC 3102 Dr HEWITT

HOMEWORK # 2

Question Sheet

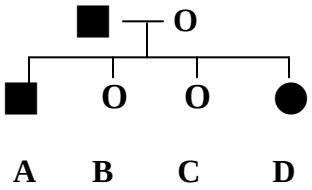
1. The behavioral **Waltzer phenotype** in mice is characterized by head shaking, rapid circling and irritability (van Abeelen and van der Kroon, 1967). True-breeding Waltzer males and females, when mated, produce offspring all with the Waltzer phenotype. True-breeding Waltzer females and non-Waltzer males produce all normal offspring, as does the reciprocal cross. F2 results from original parental crosses between true-breeding Waltzer females and non-Waltzer males are shown below:-

Normal (non-Waltzer) mice	124
Waltzer mice	47
TOTAL	171

a) State how you think the Waltzer phenotype is inherited (eg. dominant, recessive, autosomal, sex-linked) Give your reason why?

b) Perform a chi-square test to determine if the results given above are consistent with your hypothesis.

2. The figure below shows a small portion of a Huntington's disease pedigree:-



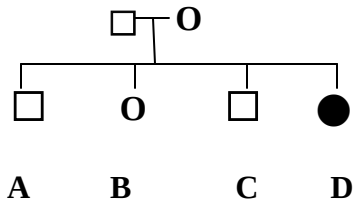
a) What are the genotypes at the Huntington locus for each of the 4 children (A,B,C,D)?

b) If child B marries an affected man, what is the probability that their first child would develop Huntington's disease?

c) If their first child is unaffected, what is the probability that their second child is affected?

d) If child A marries an unaffected woman and has 2 children, what is the probability that **both** children are unaffected?

3. The figure below shows part of a PKU pedigree:-



a) What are the possible genotypes of the unaffected children (A,B,C)?

b) Given that child A is an **unaffected** brother of a PKU child, what is the probability that he is a PKU carrier?

c) Assume A is a carrier – what genotype would his mate have to be for a child of the couple to be at risk for PKU?

d) What are A's chances (assuming he is a carrier) of marrying and producing children who are **not** at risk for having PKU? (see page 13 of text)

4. Red-green color blindness is an X-linked recessive trait in humans. In 4 different families, the parents have children together . For each of the families (A,B,C,D) shown in the table on the answer sheet, give ONE possible combination of genotypes for the parents that could have resulted in each of the combinations of children (use X^C to indicate the color-blind allele and X to indicate the normal allele).

5. Draw a pedigree for family B from above question. Label the genotypes under the symbols for each person.

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Answer sheet

NAME _____

DATE_____

1 a)_____

b) Chi-square test . Hypothesis _____

Test

Conclusion (ie. reject or retain hypothesis) _____

2. a) A _____

B _____

C _____

D _____

b) _____

c) _____

d) _____

3. a) A _____

B _____

C _____

b)_____

c) _____

d) _____

_____

4.

Family	**Children**	**Phenotype**	**Possible genotype : MOM DAD**
A	2 males	normal	
	2 females	normal	
B	2 females	color-blind	
	3 females	normal	
	2 males	color-blind	
C	4 males	color-blind	
	4 females	normal	
D	2 females	color-blind	
	2 males	normal	

5. Pedigree diagram for Family B described above.