**Meiosis Questions**

1) In a certain organism, n=6. This means that its diploid cells would have a total of \_\_\_\_\_ chromosomes.

a. 3

b. 6

c. 12

d. 2

e. 4

2) How many chromatids are present in a cell where 2n = 12 after meiosis I is complete?

 a. 3

 b. 6

 c. 12

 d. 24

 e. 48

3) Which of the following statements applies to homologous chromosomes?

 a. they are attached to each other at the centromere

 b. they are genetically identical

 c. they segregate from each other at anaphase of mitosis

 d. they contain the same genes in the same order but may have different alleles of

 some genes

4) Which of the following events occurs during meiosis but not mitosis?

 a. segregation of sister chromatids

 b. pairing of homologous chromosomes

 c. alignment of chromosomes on the metaphase plate

 d. kinetochore formation involving sister chromatids

 e. none of the above

5a) In humans, which of the following events could not give rise to an XO female?

 a. nondisjunction at meiosis II in the mother

 b. nondisjunction at meiosis I in the mother

 c. nondisjunction at meiosis II in the father

 d. nondisjunction at meiosis I in the father

 e. all of the above could give rise to an XO female

5b) Explain how you got your answer in 5a (you can draw a diagram to help illustrate your answer)

6a) Nondisjunction can occur at either the first or second division of meiosis. XYY individuals would most likely arise from nondisjunction at the \_\_\_\_\_\_ meiotic division in the \_\_\_\_\_\_.

 a. first, mother

 b. second, mother

 c. first, father

 d. second, father

 e. more than one of the above could give rise to XYY individuals

6b) Explain your answer (you can draw out a diagram to help illustrate)

**Breeding Questions**

7) If a red cat from a pure-breeding stock was mated to a yellow cat from another pure-breeding stock, and the resultant progeny are all orange, the alleles for coat pattern are considered to be:

 a. dominant

 b. recessive

 c. epistatic

 d. codominant

 e. incompletely dominant

8) A man with blood type A and a woman with blood type B, have a child with blood type AB. This is an example of:

 a. pleiotropy

 b. codominance

c. incomplete dominance

d. recessive epistasis

e. dominant epistasis

9) A true-breeding brown mouse and a true-breeding grey mouse are bred. The offspring are all black. To confirm how coat colour is controlled, you should:

 a. do a test-cross with a grey mouse

 b. back-cross the black offspring to the brown mouse

 c. allow the black mice to interbreed

 d. none of the above

 e. any of the above

10) In a cross between two Bb cats where the allele for black fur colour (B) is dominant to that specifying brown fur colour (b), what is the probability that any given kitten born will be a brown female?

11) In a cross between dihybrid LlBb individuals, where L represents long-haired which is completely dominant to l which represents short-haired, and B represents black which is completely dominant to b which represents white, what is the probability of any given offspring being both long-haired and white? Assume the two genes assort independently. You can draw diagrams, punnet square, etc to explain your answer.

12) From the parental cross AABbCcDd x AaBbCcDd, what is the probability of obtaining a AaBbccDD offspring? You can draw diagrams, punnet square, etc to explain your answer.

**Sex-linkage**

13) An allele on the X chromosome increases blood-clotting time, causing haemophilia. This trait is determined by a recessive allele. Explain how a haemophiliac offspring can be born to two parents who don't have the trait (you may demonstrate using a punnet square).