

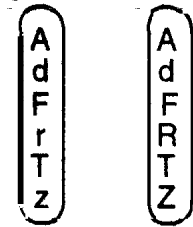
Heredity Practice Exam

1) In guinea pigs, black coat color is dominant over white. If a heterozygous black-coated guinea pig is mated with a white-coated guinea pig, how many different phenotypes with respect to coat color could be expected in the offspring?

- A) 1 B) 2 C) 3 D) 4

2) In the diagram at the right is of two homologous chromosomes. What do r and R represent?

- A) two chromosomes in a hybrid pea plant
B) two gametes that can form a zygote
C) two identical alleles
D) two different alleles



3) Based on the pattern of inheritance known as sex linkage, if a male is a hemophiliac, how many genes for this trait are present on the sex chromosomes in each of his diploid cells?

- A) 1 B) 2 C) 3 D) 4

4) The sex of a human baby is initially determined by the

- A) RNA in the sperm B) DNA and RNA in both the sperm and the egg
C) DNA in the egg D) DNA in the sperm

5) The appearance of a recessive trait in offspring of animals most probably indicates that

- A) one parent was homozygous dominant and the other parent was hybrid for that trait
B) neither parent carried a recessive gene for that trait
C) both parents carried at least one recessive gene for that trait
D) one parent was homozygous dominant and the other parent was homozygous recessive for that trait

6) In rats, black coat color is dominant over white coat color. If some of the off-spring of a cross between a black rat and a white rat are white, the black rat must have been

- A) homozygous B) a mutation C) recessive D) heterozygous

7) A colorblind woman marries a man who has normal color vision. What are the chances of having a colorblind daughter?

- A) 100% B) 50% C) 25% D) 0%

8) Which statement describes how two organisms may show the same trait, yet have different genotypes for that phenotype?

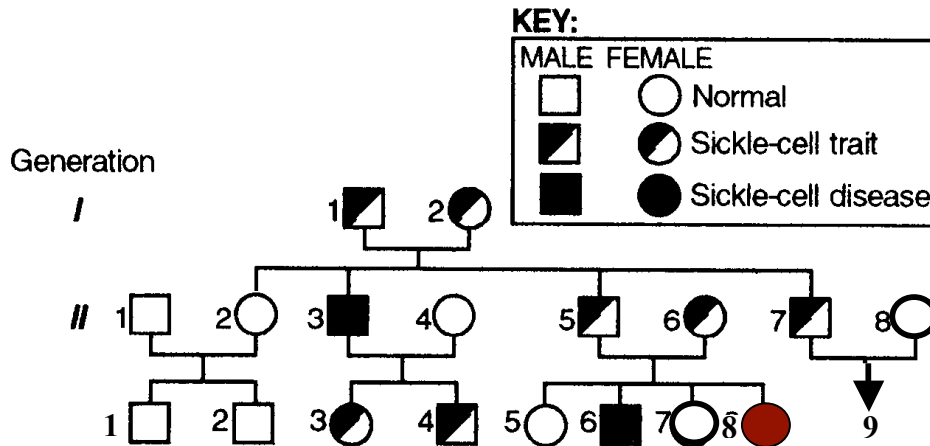
- A) One is homozygous dominant and the other homozygous recessive.
B) Both are homozygous for the dominant trait.
C) Both are heterozygous for the dominant trait.
D) One is homozygous dominant and the other heterozygous.

9) If a colorblind man marries a woman who is a carrier for color blindness, it is most probable that

- A) all of their sons will be color blind B) none of their children will have normal color vision
C) half of their sons will be color blind D) all of their sons will have normal color vision

- 10) Which represents the genotype of a homozygous condition?
A) *bc* B) *BC* C) *Bb* D) *bb*
- 11) The best method for determining if a woman may be the carrier of the trait for color blindness is to
A) give her an eye examination B) check her family pedigree for the trait
C) analyze a sample of her red blood cells D) analyze a sample of her urine
- 12) Genes for two different traits that are located next to each other on the same chromosome would most likely be
A) alleles B) inherited together
C) genotypes D) inherited separately
- 13) A student crossed wrinkled-seeded (*rr*) pea plants with round-seeded (*RR*) pea plants. Only round seeds were produced in the resulting plants. This illustrates the principle of
A) dominance B) independent assortment
C) recessive inheritance D) segregation
- 14) Some basic principles of heredity were established when Gregor Mendel crossed large numbers of pea plants and then
A) analyzed the mathematical ratios of certain traits in the offspring
B) determined how many genes had mutated
C) microdissected the chromosomes of the off-spring
D) mapped the loci of various genes
- 15) Mendel's discovery that characteristics are inherited due to the transmission of hereditary factors resulted from his
A) careful microscopic examinations of genes and chromosomes
B) breeding experiments with many generations of fruit flies
C) analysis of the offspring produced from many pea plant crosses
D) dissections to determine how fertilization occurs in pea plants
- 16) Which basic genetic concept states that chromosomes are distributed to gametes in a random fashion?
A) segregation B) linkage C) dominance D) mutation
- 17) Identical twins were separated at birth and brought together after thirteen years. They varied in height by two inches and in weight by 20 pounds. The most probable explanation for these differences is that
A) their cells did not divide by mitotic cell division
B) they developed from two different zygotes
C) their environments affected the expression of their traits
D) they differed in their genotypes

22) The pedigree chart below represents the inheritance of sickle cell anemia through three generations.



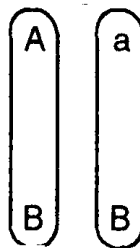
Which symbols could be used to represent individual 9 in generation III?

- A) and B) and C) and D) and

23) Two pea plants, hybrid for a single trait, produce 60 pea plants. Approximately how many of the pea plants are expected to exhibit the recessive trait?

- A) 45 B) 30 C) 15 D) 60

24) The diagram below represents a pair of homologous chromosomes. Which allelic combination represents the heterozygous condition for a trait?



- A) *BB* B) *Aa* C) *aB* D) *AB*

25) Traits controlled by genes on the X-chromosomes are said to be

- A) mutagenic B) homozygous
C) incompletely dominant D) sexed linked

26) Polydactyly is a human characteristic in which a person has six fingers per hand. The trait for polydactyly is dominant over the trait for five fingers. If a man who is heterozygous for this trait marries a woman with the normal number of fingers, what are the chances that their child would be polydactyl?

- A) 50% B) 100% C) 75% D) 0%

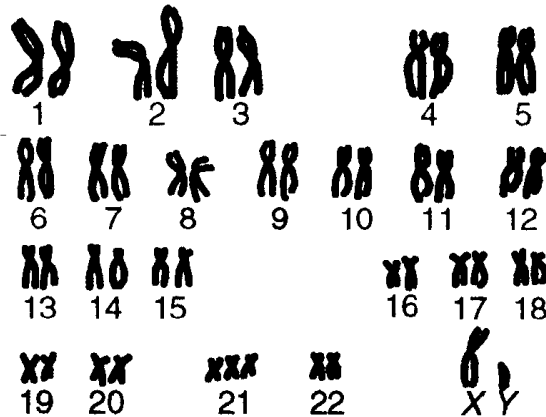
- 27) A child with blood type O has a mother with blood type A and a father with blood type B. The parental genotypes for blood types must be
 A) $I^A I^A$ and $I^B I^B$ B) $I^A i$ and $I^B I^B$ C) $I^A I^B$ and $I^B i$ D) $I^A i$ and $I^B i$
- 28) A man of blood type AB marries a woman of blood type A. What are the possible blood types of their offspring if the woman's mother was blood type O?
 A) AB only B) A, B and AB C) A and B only D) A, B and O
- 29) In a certain species of army ant, the gene for long "jaws" or mandibles (M) is dominant over the gene short mandibles or "jaws" (m). If a biologist wants to produce ants with long mandibles only, which ants should be crossed?
 A) heterozygous long-mandibled ants with heterozygous long-mandibled ants
 B) heterozygous long-mandibled ants with homozygous short-mandibled ants
 C) homozygous short-mandibled ants with homozygous short-mandibled ants
 D) homozygous long-mandibled ants with heterozygous long-mandibled ants
- 30) An inherited metabolic disorder known as phenylketonuria (PKU) is characterized by severe mental retardation. This condition results from the inability to synthesize a single
 A) hormone B) carbohydrate C) enzyme D) vitamin
- 31) The following data tables summarize the results of an experiment using primroses grown under different conditions of temperature and relative humidity.

Temperature: 20°C Relative Humidity: 20%		Temperature: 31°C Relative Humidity: 95%	
GENOTYPE	PHENOTYPE	GENOTYPE	PHENOTYPE
AA	red	AA	white
Aa	red	Aa	white
aa	white	aa	white

Which conclusion could be drawn from these data tables?

- A) Many characteristics are not inherited.
 B) There is an interaction between environment and heredity.
 C) Color in primroses is caused by gene linkage.
 D) Crossing-over occurs only when plants are grown at higher temperatures.
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The following questions refer to the given diagram of human chromosomes.



- 32) Which procedure can be performed during fetal development to detect the chromosomal disorder illustrated by the diagram?
 A) amniocentesis B) genetic counseling C) cloning D) urine analysis
- 33) The diagram represents a
 A) disjunction B) synapsis C) karyotype D) deletion
- 34) This chromosomal arrangement indicates that the individual has
 A) Tays-Sachs disease B) phenylketonuria
 C) Down's syndrome D) sickle-cell anemia
- 35) The chromosomes are arranged to show
 A) nucleotides B) independent assortment
 C) tetrads D) homologous pairs
- 36) The individual from whom these chromosomes were taken is a
 A) male B) female
- 37) Three brothers have blood types A, B, and O. What are the chances that the parents of these three will produce a fourth child whose blood type is AB?
 A) 0% B) 100% C) 25% D) 50%
- 38) A woman carrying the gene for hemophilia marries a man who is a hemophiliac. What percentage of their children can be expected to have hemophilia?
 A) 0% B) 75% C) 50% D) 100%
- 39) When Mendel was experimenting with pea plants, he noted that the traits for seed color and plant height were inherited separately. This observation most directly contributed to an understanding of
 A) codominance B) independent assortment
 C) dominance D) intermediate inheritance

- 40) Which statement correctly describes the normal number and type of chromosomes present in human body cells of a particular sex?
- A) Females have 23 pairs of autosomes.
 - B) Males have 22 pairs of autosomes and 1 pair of sex chromosomes known as XX
 - C) Males have 23 pairs of autosomes.
 - D) Males have 22 pairs of autosomes and 1 pair of sex chromosomes known as XY.

ANSWERS

1. B 2. D 3. A 4. D 5. C 6. D 7. D 8. D 9. C 10. D 11. B 12. B 13. A
14. A 15. C 16. A 17. C 18. C 19. A 20. C 21. D 22. C 23. C 24. B 25. D 26. A
27. D 28. B 29. D 30. C 31. B 32. A 33. C 34. C 35. D 36. A 37. C 38. C 39. C
40. D