

## Genetics Practice Questions

**Name:** \_\_\_\_\_

**Date:** \_\_\_\_\_

1. In humans, **B** is the allele for brown eyes and **b** is the allele for blue eyes. Two brothers both have brown eyes, but one of them has both the **B** and **b** alleles while the other only has **B** alleles. Which statement is true about the brothers?

A. They have the same genotype and phenotype.

B. They have different phenotypes and genotypes.

C. They have the same phenotype but different genotypes.

D. They have the same genotype but different phenotypes.

4. Which of the following *best* describes the number of chromosomes in a normal human liver cell?

A. 23 pairs of chromosomes

B. 46 different types of chromosomes

C. 46 male chromosomes and 46 female chromosomes

D. 23 original chromosomes and 23 duplicate chromosomes

2. Use this Punnett square to answer the question.

$w$	$w$
$w$	
$w$	

In horses, the gene for white hair ( $W$ ) is dominant to the gene for non-white hair ( $w$ ). A horse with genotype ( $WW$ ) was crossed with a horse with genotype ( $ww$ ), as shown in the Punnett square.

What fraction of the offspring should be expected to have white hair?



4. Which of the following *best* describes the number of chromosomes in a normal human liver cell?

  - A. 23 pairs of chromosomes
  - B. 46 different types of chromosomes
  - C. 46 male chromosomes and 46 female chromosomes
  - D. 23 original chromosomes and 23 duplicate chromosomes

5. A partial Punnett square is shown below.

AA	AA
Aa	Aa

Which of the following statements describes the parental genotypes that would result in this Punnett square?

- A. Both parents are heterozygous.
  - B. Both parents are homozygous dominant.
  - C. One parent is homozygous recessive and the other parent is heterozygous.
  - D. One parent is homozygous dominant and the other parent is heterozygous.

6. According to Mendel's law of segregation, which of the following statements describes what happens to the alleles of a gene pair?

  - A. The alleles are moved to different chromosomes.
  - B. The alleles are mutated in the process of mitosis.
  - C. The alleles are separated during fertilization.
  - D. The alleles are separated during gamete formation.

7. Female cattle that have white coats are crossed with male cattle that have red coats. Both male and female offspring have roan coats, which are coats with both red hairs and white hairs.

Which of the following *best* describes the genetics of coat color in the cattle?

- A. The red and white alleles are sex-linked.
  - B. The red and white alleles are codominant.
  - C. The red allele is recessive to the white allele.
  - D. The red allele is dominant to the white allele.
8. In fish of the species *Perissodus microlepis*, some individuals have mouths that open to the right and some individuals have mouths that open to the left. The direction of the mouth opening is a genetic trait controlled by a single gene. The allele for a right-opening mouth (**R**) is dominant to the allele for a left-opening mouth (**r**).

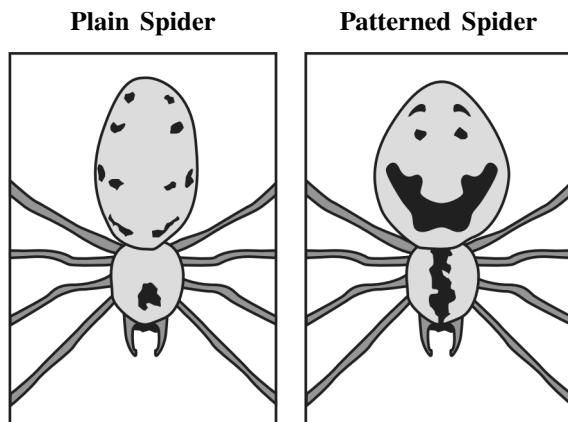
If two fish heterozygous for the mouth trait are crossed, what is the expected ratio of phenotypes in the offspring?

- A. 1 right-opening mouth : 3 left-opening mouth
  - B. 2 right-opening mouth : 2 left-opening mouth
  - C. 3 right-opening mouth : 1 left-opening mouth
  - D. 4 right-opening mouth : 0 left-opening mouth
9. Genetic engineering in corn allows genes from bacteria to be added to the genetic material of corn. In traditional breeding, genes of only closely related types of corn can be exchanged.

What is one risk of genetically engineering corn plants?

- A. decreases the amount of pesticide needed to grow corn.
- B. increases the length of time corn can be stored before it rots
- C. increases the chance of adding a trait to corn that causes allergies
- D. decreases the number of corn plants a farmer can grow in a season

10. Hawaiian happy face spiders from the island of Maui can have different markings, as shown below. A single gene determines the markings on the spiders.



A plain spider is crossed with a patterned spider. The patterned spider is homozygous. The pattern allele is dominant to the plain allele.

What percentage of the offspring from this cross are expected to be patterned instead of plain?

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

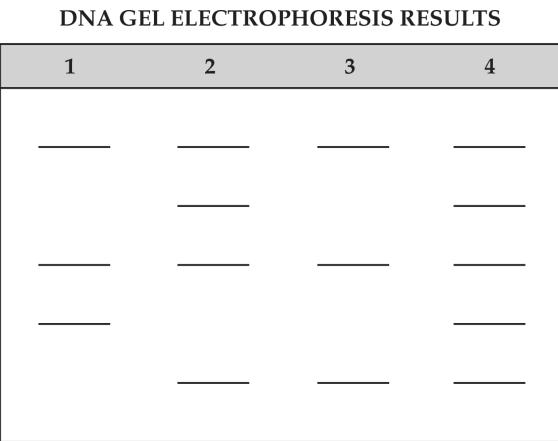
11. The table below shows the genotypes that result in four different blood types in humans.

Genotype	Blood Type
<b>I<sup>A</sup>I<sup>A</sup>, I<sup>A</sup>i</b>	A
<b>I<sup>B</sup>I<sup>B</sup>, I<sup>B</sup>i</b>	B
<b>I<sup>A</sup>I<sup>B</sup></b>	AB
<b>ii</b>	O

Based on the information in the table, which of the following describes alleles **I<sup>A</sup>** and **I<sup>B</sup>**?

- A. The **I<sup>A</sup>** and **I<sup>B</sup>** alleles show sex linkage.
- B. The **I<sup>A</sup>** allele is recessive to the **I<sup>B</sup>** allele.
- C. The **I<sup>A</sup>** allele is dominant to the **I<sup>B</sup>** allele.
- D. The **I<sup>A</sup>** and **I<sup>B</sup>** alleles show codominance.

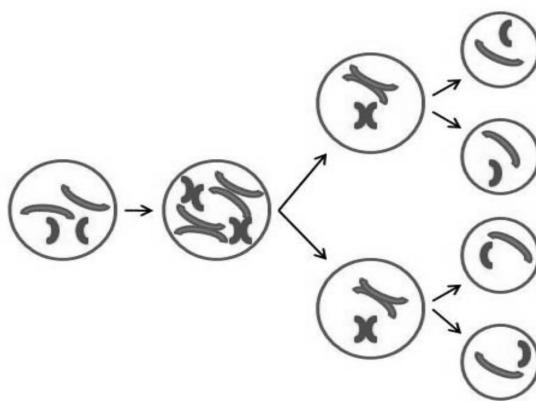
12. DNA from four organisms was examined using gel electrophoresis. The results are shown in the diagram below.



According to the data, which of these pairs of organisms are *most closely* related?

- A. 1 and 2                      B. 2 and 3  
C. 2 and 4                      D. 3 and 4
13. Which of the following laws or principles states that the two alleles of a gene pair separate during gamete formation?
- A. law of segregation  
B. principle of linkage  
C. principle of dominance  
D. law of independent assortment

14. The distribution of chromosomes in one type of cell division is shown in the diagram below.



Which process and type of resulting cells are represented in the diagram?

- A. mitosis, which produces gametes  
B. mitosis, which produces body cells  
C. meiosis, which produces gametes  
D. meiosis, which produces body cells

15. Which of the following statements correctly describes meiosis?

- A. Cells divide only once during meiosis.  
B. Meiosis does not occur in reproductive cells.  
C. The cells produced at the end of meiosis are genetically identical to the parent cell.  
D. The cells produced at the end of meiosis contain half the number of chromosomes as the parent cell.

16. Trisomy 21 is a genetic disorder in which an individual has an extra copy of chromosome 21?

Which process could cause trisomy 21?

- A. Failure of a chromosome to replicate during mitosis
  - B. Failure of chromosome pairs to join during fertilization
  - C. Failure of a chromosome to cross over during replication
  - D. Failure of chromosome pairs to separate properly during meiosis
17. What is a difference between mitosis and meiosis?

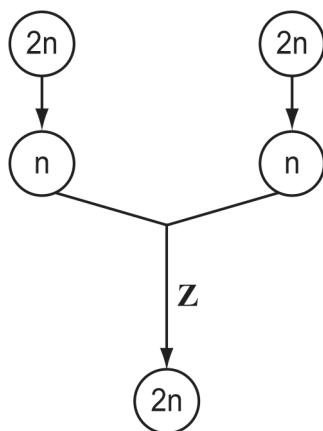
- A. Mitosis occurs in all the cells in animals and plants, while meiosis occurs in only in bacteria.
  - B. In mitosis, the products are identical to the parent cell, while in meiosis the products are different from the parent cell.
  - C. In mitosis, one cell divides into two cells, while in meiosis two cells combine to make one cell.
  - D. Mitosis involves separating the chromosomes, while meiosis involves only the cytoplasm of the cell.
18. Which of the following is the *primary* advantage of sexual reproduction when compared to asexual reproduction?

- A. There is a greater number of offspring.
- B. There is more food available to offspring.
- C. There is greater genetic variety in offspring.
- D. There is a longer development time for offspring.

19. Which of the following occurs in meiosis but *not* in mitosis?

- A. Chromosomes coil and condense.
- B. Spindle fibers form across the cell.
- C. The nuclear membrane breaks down.
- D. Pairs of homologous chromosomes are separated.

20. The diagram below represents steps in sexual reproduction.



Which of the following occurs in the step labeled **Z**?

- A. fertilization
- B. meiosis
- C. mitosis
- D. translocation

Genetics Practice Questions      12/19/2018

1.  
Answer: C
2.  
Answer: D
3.  
Answer: B
4.  
Answer: A
5.  
Answer: D
6.  
Answer: D
7.  
Answer: B
8.  
Answer: C
9.  
Answer: C
10.  
Answer: D
11.  
Answer: D
12.  
Answer:
13.  
Answer: A
14.  
Answer: C
15.  
Answer: D
16.  
Answer: D
17.  
Answer: B
18.  
Answer: C
19.  
Answer: D
20.  
Answer: A