

Genetics Practice Examination #3

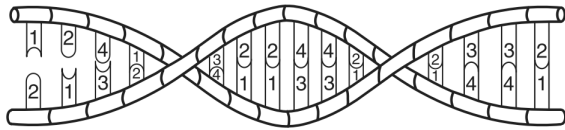
Name: _____

Date: _____

1. Which statement best describes the relationship between the number of genes and the number of chromosomes in human skin cells?

- A. There are more genes than chromosomes in skin cells.
- B. There are more chromosomes than genes in skin cells.
- C. There are equal numbers of genes and chromosomes in skin cells.

2. The diagram below represents a section of a molecule that carries genetic information.



The pattern of numbers represents

- A. a sequence of paired bases
- B. the order of proteins in a gene
- C. folds of an amino acid
- D. positions of gene mutations

3. Which two structures of a frog would most likely have the same chromosome number?

- A. skin cell and fertilized egg cell
- B. zygote and sperm cell
- C. kidney cell and egg cell
- D. liver cell and sperm cell

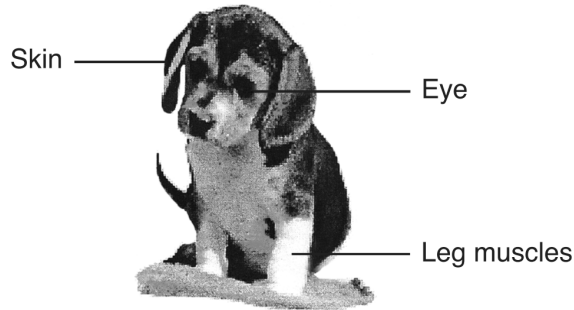
4. Chromosomes can be described as

- A. large molecules that have only one function
- B. folded chains of bonded glucose molecules
- C. reproductive cells composed of molecular bases
- D. coiled strands of genetic material

5. Which statement describes starches, fats, proteins, and DNA?

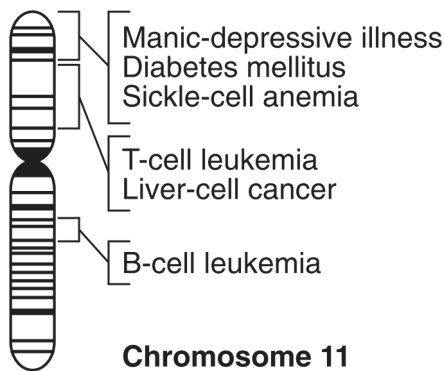
- A. They are used to store genetic information.
- B. They are complex molecules made from smaller molecules.
- C. They are used to assemble larger inorganic materials.
- D. They are simple molecules used as energy sources.

6. Several structures are labeled in the diagram of a puppy shown below.



Every cell in each of these structures contains

- A. equal amounts of ATP
 - B. identical genetic information
 - C. proteins that are all identical
 - D. organelles for the synthesis of glucose
7. The diagram below represents the banding pattern for human chromosome 11, with some of the bands labeled.



The bands represent

- A. proteins
- B. genes
- C. starches
- D. enzymes

8. The colors and scents of plants attract helpful insects and repel insects that feed on them. The production of the proteins that provide these colors and scents is the direct result of the

- A. behavior learned from parent plants
- B. presence of specific genes
- C. the genetic makeup of the surrounding vegetation
- D. inability of plants to move as animals do

9. Which organism would most likely have new gene combinations?

- A. a frog that was produced from a skin cell of a frog
- B. a hamster resulting from sexual reproduction
- C. a bacterium resulting from asexual reproduction
- D. a starfish that grew from part of a starfish

10. Which statement describes asexual reproduction?

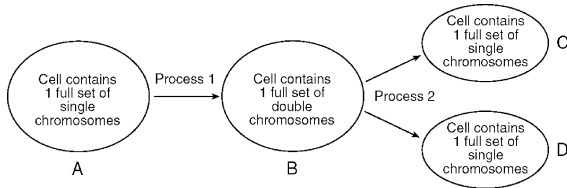
- A. Adaptive traits are usually passed from parent to offspring without genetic modification.
- B. Mutations are not passed from generation to generation.
- C. It always enables organisms to survive in changing environmental conditions.
- D. It is responsible for many new variations in offspring.

11. Which row in the chart below best describes asexual reproduction?

Row	Number of Parents	Comparison of Offspring to Parents
(1)	one	identical
(2)	one	different
(3)	two	identical
(4)	two	different

- A. Row (1) B. Row (2)
 C. Row (3) D. Row (4)

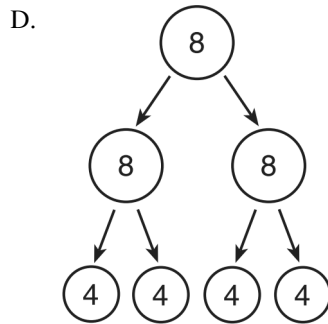
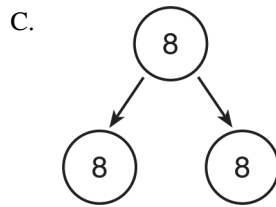
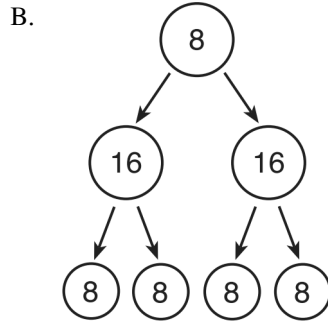
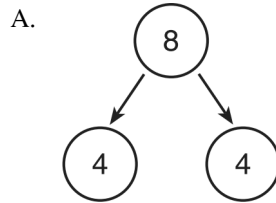
12. Base your answer(s) to the following question(s) on the diagram below and on your knowledge of biology. The diagram represents a single-celled organism, such as an amoeba, undergoing the changes shown.



As a result of these processes, the single-celled organism accomplishes

- A. gamete production
 B. energy production
 C. sexual reproduction
 D. asexual reproduction

13. The number in each circle below represents the chromosome number of the cell. Which diagram represents the production of offspring by an asexually reproducing organism?



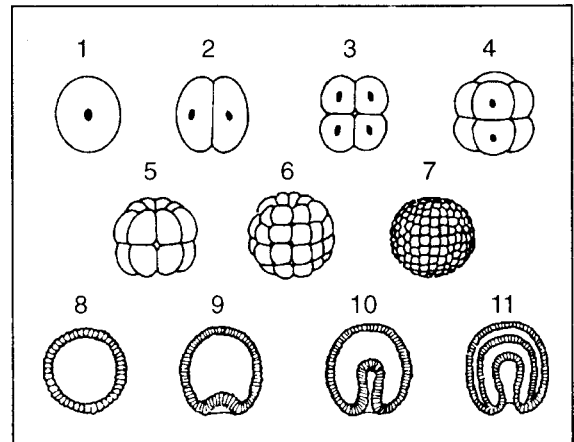
14. Potatoes were the main crop in Ireland in the 1800s. Almost the entire population of Ireland was dependent on a single variety of potato, the “lumper.” These potatoes were reproduced by a method of asexual reproduction known as vegetative propagation. In the middle of the 1800s, a disease caused by a fungus killed almost the entire lumper crop within two years. As a result, millions of people in Ireland died of starvation. The most likely reason the potato disease was able to destroy the potato crop in such a short time is that the

- A. potato population lacked variations
- B. lumper variety had a long reproductive cycle
- C. lumper had several variations caused by vegetative propagation
- D. potato population in Ireland utilized all of the finite resources

15. Which statement best explains the significance of meiosis in the evolution of a species?

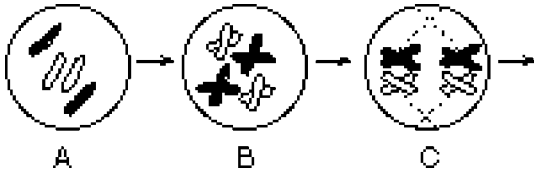
- A. Meiosis produces eggs and sperm that are alike
- B. Meiosis provides for chromosomal variation in the gametes produced by an organism.
- C. Equal numbers of eggs and sperm are produced by meiosis.
- D. The gametes produced by meiosis ensure the continuation of any particular species by asexual reproduction.

16. Which event does *not* occur between stages 2 and 11 in the process represented in the diagram below?

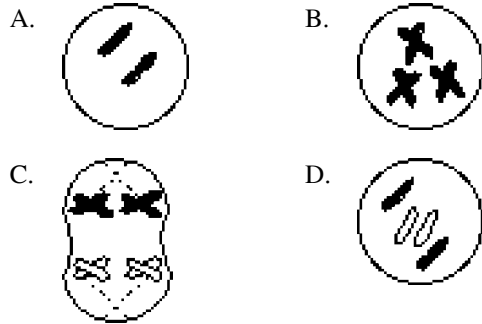


- A. a decrease in cell size
- B. DNA replication
- C. the development of embryonic layers
- D. fertilization

17. The accompanying diagrams represent some events in a cell undergoing normal meiotic cell division.



Which diagram most likely represents a new cell resulting from meiotic cell division of the cell shown above?



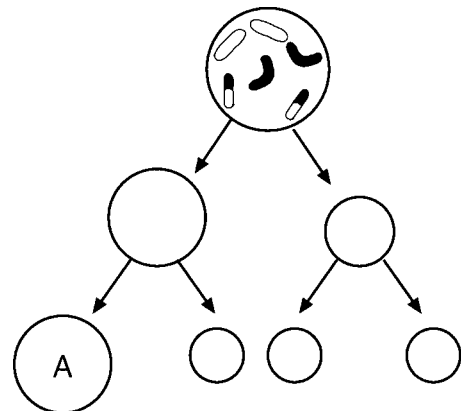
18. Most cells in the body of a fruit fly contain eight chromosomes. In some cells, only four chromosomes are present, a condition which is a direct result of

- A. mitotic cell division
- B. meiotic cell division
- C. embryonic differentiation
- D. internal fertilization

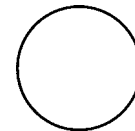
19. Meiosis and fertilization are important processes because they may most immediately result in

- A. many body cells
- B. immune responses
- C. genetic variation
- D. natural selection

20. An incomplete diagram of meiosis in the ovary of an animal is shown.



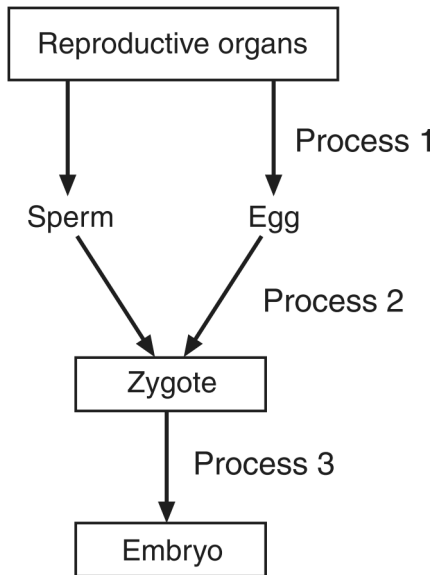
On the diagram below, draw in the chromosomes of cell A. Your drawing should show the usual result of the process of meiosis.



21. During meiosis, crossing-over (gene exchange between chromosomes) may occur. Crossing-over usually results in

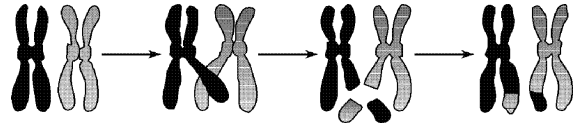
- A. overproduction of gametes
- B. fertilization and development
- C. the formation of identical offspring
- D. variation within the species

22. Base your answer(s) to the following question(s) on the diagram below and on your knowledge of biology.



State why Process 2 is necessary in sexual reproduction.

23. The diagram shows a process that can occur during meiosis.



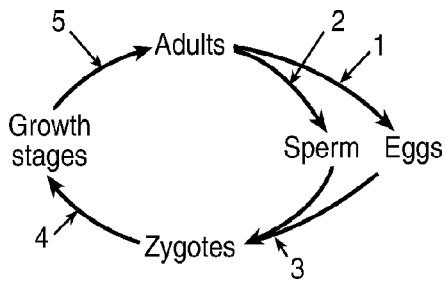
The most likely result of this process is

- A. a new combination of inheritable traits that can appear in the offspring
- B. an inability to pass either of these chromosomes on to offspring
- C. a loss of genetic information that will produce a genetic disorder in the offspring
- D. an increase in the chromosome number of the organism in which this process occurs

24. Compared to human cells resulting from mitotic cell division, human cells resulting from meiotic cell division would have

- A. twice as many chromosomes
- B. the same number of chromosomes
- C. one-half the number of chromosomes
- D. one-quarter as many chromosomes

25. The arrows in the diagram below illustrate processes in the life of a species that reproduces sexually.

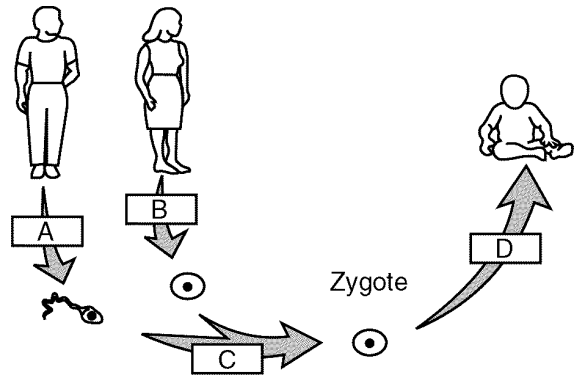


Which processes result directly in the formation of cells with half the amount of genetic material that is characteristic of the species?

- A. 1 and 2 B. 2 and 3
 C. 3 and 4 D. 4 and 5
26. A cell resulting from the fertilization of an egg begins to divide. Two cells are formed that normally remain attached and could develop into a new individual. If the two cells become separated, which statement describes what would most likely occur?

- A. The cells would each have all of the needed genetic information, and both could survive.
 B. The cells would each have only one-half of the needed genetic information, so both would die.
 C. One cell would have all of the needed genetic information and would survive, but the other would have none of the needed genetic information and would die.
 D. Each cell would have some of the needed genetic information, but would be unable to share it, so both would die.

27. The diagram below represents processes involved in human reproduction.

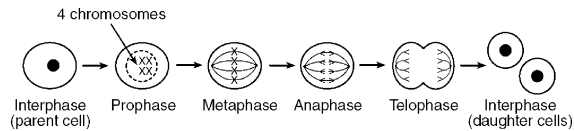


Which row in the chart below correctly identifies the processes represented by the letters in the diagram?

Row	A	B	C	D
(1)	mitosis	meiosis	fertilization	differentiation
(2)	meiosis	meiosis	fertilization	differentiation
(3)	meiosis	mitosis	differentiation	fertilization
(4)	mitosis	mitosis	differentiation	fertilization

- A. Row (1) B. Row (2)
 C. Row (3) D. Row (4)

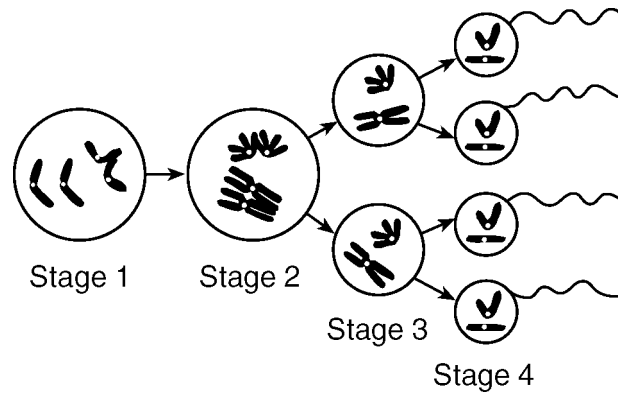
28. The diagram below illustrates the process of cell division.



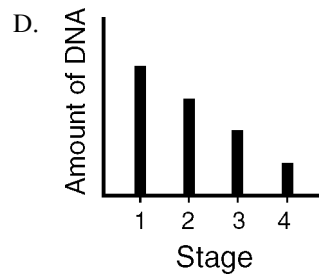
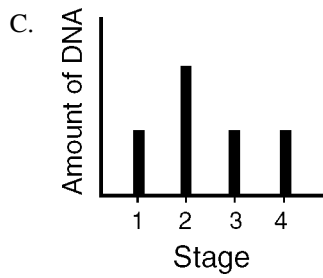
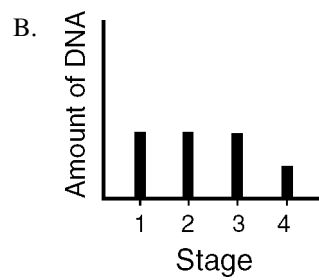
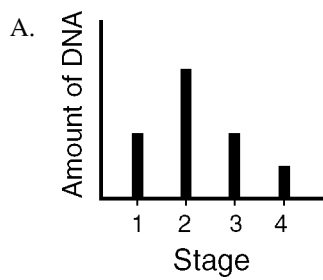
What is the significance of anaphase in this process?

- A. Anaphase usually ensures that each daughter cell has the same number of chromosomes as the parent cell.
- B. Anaphase usually ensures that each daughter cell has twice as many chromosomes as the parent cell.
- C. In anaphase, the cell splits in half.
- D. In anaphase, the DNA is being replicated.

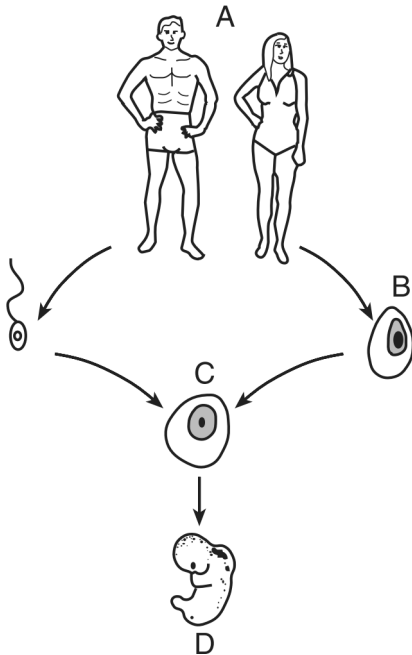
29. The diagram below illustrates some of the changes that occur during gamete formation.



Which graph best represents the changes in the amount of DNA in one of the cells at each stage?



30. The diagram below shows stages of human reproduction.



The direct result of fertilization is represented at

- A. A B. B C. C D. D

31. Which expression correctly represents a reproductive process that usually occurs in humans where $2n$ is equal to the number of chromosomes in each body cell?

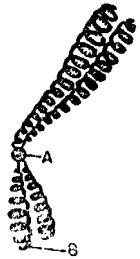
- A. $n + n \rightarrow n$ B. $n + n \rightarrow 2n$
 C. $n + 2n \rightarrow 2n$ D. $2n + 2n \rightarrow 4n$

32. Flower color in primrose plants is controlled by an individual gene. The sudden appearance of one white flowering primrose in a plant breeder's field of red primrose plants is most likely due to

- A. a change in the amount of glucose produced during photosynthesis
 B. the use of a new natural fertilizer on the field
 C. rapid mitotic divisions within the developing seeds
 D. a random change in the structure of DNA during meiosis

33. The diagram shown represents a microscopic structure observed during the process of cell division. Letter A indicates a

- A. nucleolus B. ribosome
 C. centriole D. centromere



34. The diagram shown represents a microscopic structure observed during the process of cell division. Letter B indicates a

- A. centrosome B. spindle fiber
 C. chromatid D. cell plate

35. Which is a characteristic of the group of diseases known as cancer?

- A. uncontrolled cell division
- B. the formation of only monoploid cells
- C. meiotic cell division in body cells
- D. the rapid formation of zygotes

36. The mitotic cell division of tomato cells *differs* from the mitotic cell division of earthworm cells in that dividing tomato cells

- A. form a spindle
- B. form a cell plate
- C. have centrioles
- D. have cell membranes