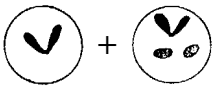
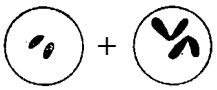
Mitosis & Meiosis Practice Questions

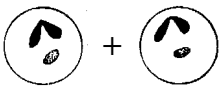
Name: _____ **Date:** _____

1. The diagram shown represents a cell that will undergo mitosis. Which diagrams below best illustrate the nuclei of the daughter cells that result from a normal mitotic cell division of the parent cell shown?

A. 

B. 

C. 

D. 

2. If the diploid chromosome number of a cloned plant is 12, the chromosome number of the plant cell used to produce the cloned plant is

A. 3 B. 6 C. 12 D. 24

3. Which sequence of processes occurs in the production of a cloned plant?

A. meiosis → new plant

B. mitosis → new plant

C. meiosis → fertilization → new plant

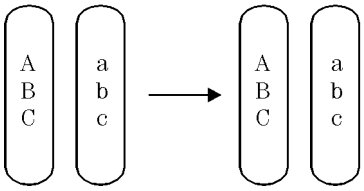
D. mitosis → fertilization → new plant

4. Uncontrolled cell division is characteristic of

A. cancer B. meiosis

C. budding D. sporulation

5. Which process, occurring during synapsis, would result in the chromosomal changes illustrated in the diagram.



A. replication

B. crossing-over

C. independent assortment

D. segregation

6. Normally, a complete set of chromosomes ($2n$) is passed on to each daughter cell as a result of

A. reduction division

B. mitotic cell division

C. meiotic cell division

D. nondisjunction

7. The diploid chromosome number in a certain species of fish is 20. How many chromosomes would normally be found in bone cell of this fish?

A. 10 B. 20 C. 23 D. 40

8. A comparison of karotypes from two carrot plants cloned from the same carrot root tissue should show that all cells of these carrot plants have

A. monoploid nuclei

B. centrioles

C. the diploid condition

D. chloroplasts

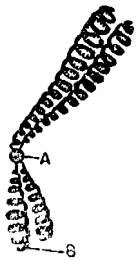
9. The diagram shown represents a microscopic structure observed during the process of cell division. Letter *A* indicates a

A. nucleolus

B. ribosome

C. centriole

D. centromere



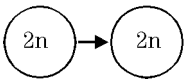
10. The diagram shown represents a microscopic structure observed during the process of cell division. Letter *B* indicates a

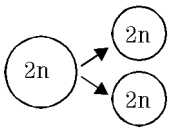
A. centrosome
B. spindle fiber
C. chromatid
D. cell plate

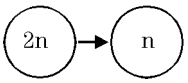
11. One difference between miotic cell division in animals and in plants is that in plants

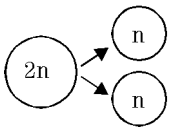
A. chromosomes are duplicated, whereas in animals chromosomes are not duplicated
B. chromosomes are separated, whereas in animals chromosomes are not separated
C. spindle fibers are formed, whereas in animals spindle fibers are not formed
D. cell plates are formed, whereas in animals cell plates are not formed

12. Which diagram most correctly represents the process of mitosis?

A. 

B. 

C. 

D. 

13. Which statement best describes a difference between cell division in plant and animal cells?

A. In animal cells, cytoplasmic division is accomplished by "pinching in" of the cell membrane, while in plant cells a cell plate is synthesized.
B. In plant cells, cytoplasmic division is accomplished by a "pinching in" of the cell membrane, while in animal cells a cell plate is synthesized.
C. In plant cells, centrosomes have a distinct role in spindle formation, while in animal cells centrosomes do not function during cell division.
D. In animal cells, replication of chromosomes occurs during the nondividing phase, while in plant cells replication occurs when the nuclear membrane disintegrates.

14. New cells are produced within bone marrow as a direct result of

A. gamete formation

B. meiotic cell division

C. polar body formation

D. mitotic cell division

15. 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

16. All types of asexual reproduction involve the process known as

A. mitosis

B. fertilization

C. artificial pollination

D. reduction division

17. Normal mitotic cell division results in each daughter cell having

A. half the number of chromosomes as the parent cell

B. the same number and kinds of chromosomes as the parent cell

C. the same number but different kinds of chromosomes as the parent cell

D. twice the number of chromosomes as the parent cell

18. 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

19. How many chromosomes will be found in each of the two new cells formed as a result of mitotic cell division?

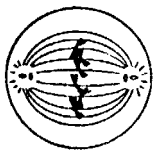
A. only one-half as many chromosomes as the parent cell

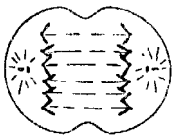
B. twice as many chromosomes as the parent cell

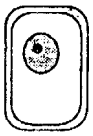
C. three times as many chromosomes as the parent cell

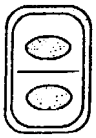
D. the same number of chromosomes as the parent cell

20. Which diagram below represents a plant cell close to the final stage of mitotic cell division?

A. 

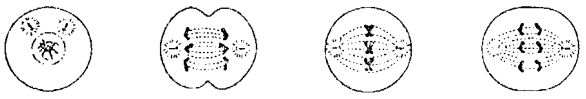
B. 

C. 

D. 

21. Which is the correct sequence for the stages of mitotic cell division represented by the diagrams shown?

A. A → B → C → D
B. A → C → D → B
C. B → A → D → C
D. B → C → D → A



22. Which is a true statement about normal mitotic cell division?

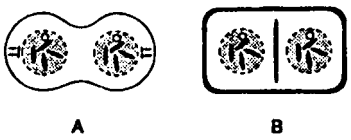
A. Each daughter cell produced has only one-fourth the number of chromosomes of the parent cell.

B. Each daughter cell produced has only one-half the number of chromosomes of the parent cell.

C. Each daughter cell produced has the same number of chromosomes as the parent cell.

D. Each daughter cell produced has twice the number of chromosomes of the parent cell.

23. In the diagrams of mitotic cell division shown, which structure is present in diagram B but *not* in diagram A?



A. centriole
B. cell plate
C. cell membrane
D. cytoplasm

24. An organism's capacity for regeneration is most dependent on the

A. amount of surface area in its circulatory system

B. relative complexity of its endocrine glands

C. relative number of undifferentiated cells in its body

D. amount of oxygen supplied by its respiratory system

25. Which statement best describes the division of the cytoplasm and the nucleus in budding?

A. Both the cytoplasm and the nucleus divide equally.

B. The cytoplasm divides unequally, but the nucleus divides equally.

C. The cytoplasm divides equally, but the nucleus divides unequally.

D. Both the cytoplasm and the nucleus divide unequally.

26. What is one difference between mitotic cell division in plants and mitotic cell division in animals?

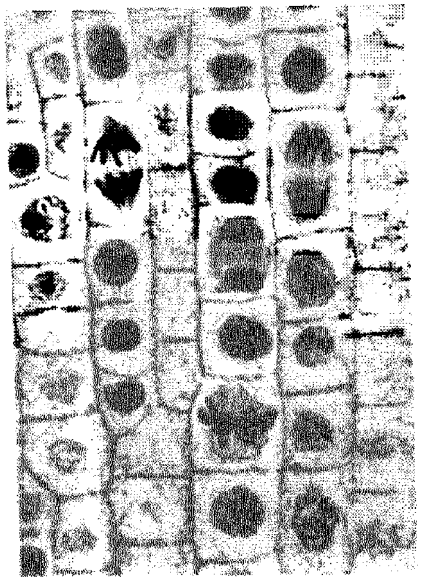
A. Chromosomes are replicated in plants but not in animals.

B. The replicated chromosomes separate in plants but not in animals.

C. A cell plate divides the cytoplasm in plants but not in animals.

D. The nuclear membrane reforms in plants but not in animals.

27. A photomicrograph of cells involved in various stages of nuclear division is shown.



Which title is most appropriate for this photomicrograph?

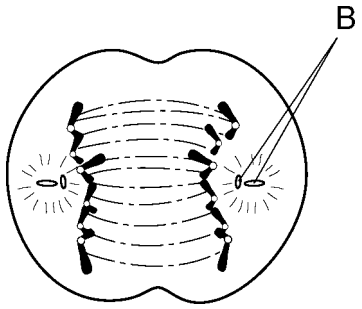
A. Mitosis in an Onion Root Tip

B. Cell Division in Human Blood Cells

C. Meiosis in Male Gametes

D. Gametogenesis in Yeast Cells

28. The cell in the diagram below illustrates a stage of mitotic cell division.



Letter *B* indicates the

A. paired chromosomes

B. centrioles

C. cell plate

D. endoplasmic reticulum

29. Which two processes are involved in mitotic cell division?

A. nuclear duplication and cytoplasmic division

B. nuclear duplication and cytoplasmic duplication

C. spermatogenesis and cytoplasmic duplication

D. oogenesis and cytoplasmic division

30. Which mitotic event in the chart occurs after the other three events have taken place?

A	Appearance of spindle fibers
B	Separation of chromatids by the action of spindle fibers
C	Disintegration of the nuclear membrane
D	Replication of chromosomes

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

31. A colony of red bacteria is allowed to reproduce for 16 generations. A scientist examines the colony at the end of the time and notes that all the individuals are almost identical in all characteristics. This evidence suggest that the bacteria

A. did not receive the proper nutrients

B. reproduce sexually

C. exchange genetic material

D. reproduced asexually

32. 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

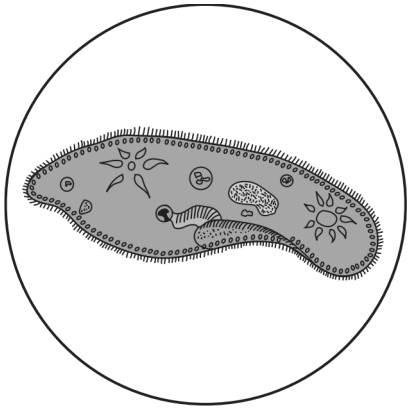
A. potato population lacked variations

B. lumper variety had a long reproductive cycle

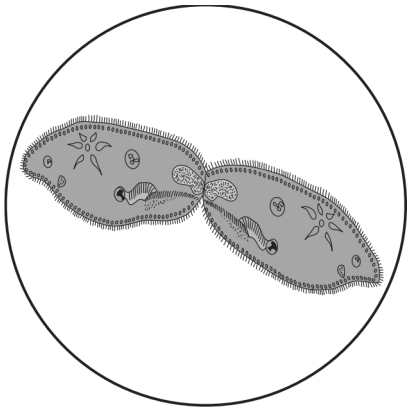
C. lumper had several variations caused by vegetative propagation

D. potato population in Ireland utilized all of the finite resources

33. A student made the drawing shown below of a single-celled organism as he observed it with a compound light microscope under the high-power objective.



Several minutes later, he drew the diagram shown below of the same organism, using the same magnification.



These drawings show that the organism is carrying out the process of

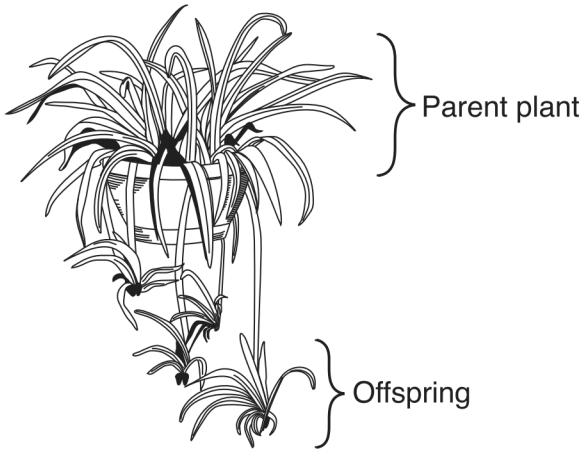
A. asexual reproduction

B. sexual reproduction

C. embryo formation

D. genetic alteration

34. Spider plants can reproduce both sexually and asexually. The diagram below represents a spider plant reproducing asexually by a method known as vegetative propagation.



Which statement best describes the relationship between the parent plant and the offspring in the diagram?

A. The cells of the offspring contain half the amount of DNA as the cells of the parent plant.

B. The parent plant provides genetic material to the offspring through its gametes.

C. The cells of the offspring have the same genetic content as the cells of the parent plant.

D. The cells of the parent plant have more genetic diversity, compared to the cells of the offspring.

35. An organism that reproduces asexually will have offspring that have

A. the same genetic information as both of its parents

B. different genetic information from either of its parents

C. the same genes as its parent

D. different genes from its parent

36. In the process of oogensesis in humans, a primary sex cell undergoes divisions that normally produce

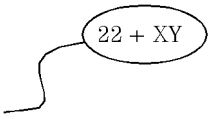
A. four monoploid sperm

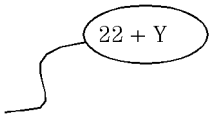
B. one monoploid sperm and three diploid eggs

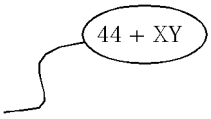
C. one monoploid egg and three polar bodies

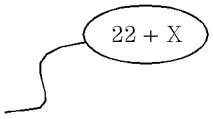
D. four monoploid eggs

37. Which diagram represents a sperm that can unite with a normal egg to produce a zygote that will develop into a normal human male embryo?

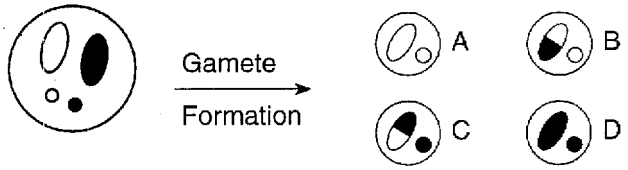
A. 

B. 

C. 

D. 

38. In the diagram shown, which type of change most likely caused the new combination of traits in gametes B and C?



A. an alteration in the chemical composition of a gene

B. a change in the chromosome number due to nondisjunction

C. a change in the chromosome composition due to crossing-over

D. an alteration in the number of sugars in DNA

39. In which process is the pairing of homologous chromosomes followed by the disjunction of these chromosome pairs?

A. binary fission
B. budding
C. meiosis
D. fertilization

40. The process of meiotic cell division in a human male usually forms

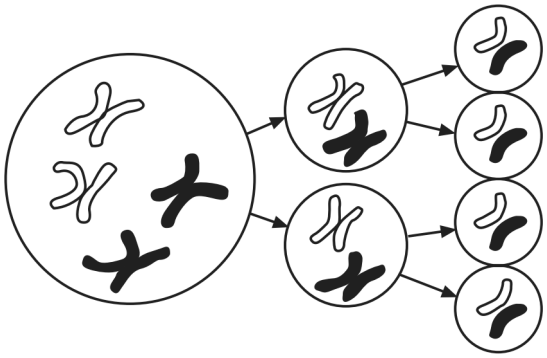
A. one diploid cell, only

B. four diploid cells

C. one monoploid cell, only

D. four monoploid cells

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



Which process is represented in the diagram?

A. asexual reproduction

B. meiosis

C. mitosis

D. vegetative propagation

42. The normal diploid chromosome number of the house mouse, *Mus musculus*, is 40. How many pairs of homologous chromosomes would a normal zygote of *Mus musculus* contain?

A. 10 B. 20 C. 40 D. 80

43. The separation of homologous pairs of chromosomes during gametogenesis is known as

A. replication B. synthesis

C. alignment D. disjunction

44. Each root cell of a giant redwood tree contains 22 chromosomes. Two new cells that each contain 11 pairs of chromosomes are produced when one of these cells undergoes cell division involving the process of

A. oogenesis B. meiosis

C. mitosis D. synapsis

45. A cell with a diploid chromosome number of 12 divided two times, producing four cells with six chromosomes each. The process that produced these four cells was most likely

A. internal fertilization

B. external fertilization

C. mitotic cell division

D. meiotic cell division

46. A difference between gametes produced by oogenesis and gametes produced by spermatogenesis is that gametes produced by oogenesis

A. contain more stored nutrients

B. undergo cleavage prior to fertilization

C. mature into motile sex cells

D. contain more homologous chromosomes

47. The horse, *Equus caballus*, has 64 chromosomes in its body cells. The donkeys, *Equus asinus*, has 62. How many chromosomes would most likely be found in the body cells of a hybrid mule resulting from a mating of these two animals?

A. 126 B. 95 C. 63 D. 32

48. Which situation is a result of crossing-over during meiosis?

A. Genes are duplicated exactly, ensuring that offspring will be identical to the parents.

B. Chromatids thicken and align themselves, helping to ensure genetic continuity.

C. Genes are rearranged, increasing the variability of offspring.

D. Chromatids fail to sort independently, creating abnormal chromosome numbers.

49. In sexually reproducing species, doubling of the chromosome number from generation to generation is prevented by events that take place during the process of

A. gametogenesis B. cleavage

C. nondisjunction D. fertilization

50. The extra chromosome found in the cells of humans with Down's syndrome is the result of

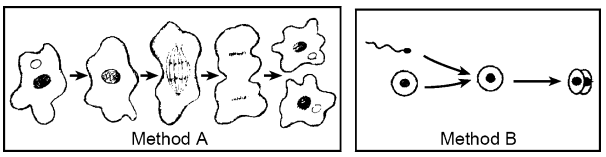
A. failure of the developing embryo to undergo meiotic cell division

B. failure of the chromatids to replicate between mitotic cell divisions

C. nondisjunction during meiotic cell division in the gonads of a parent

D. nondisjunction during mitotic cell division in the muscle cells of a parent

51. How does the type of reproduction shown in method *A* in the accompanying diagram differ from the type of reproduction shown in method *B*?



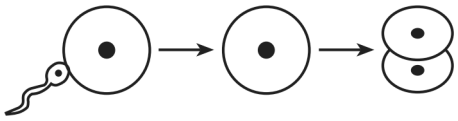
A. Method A illustrates sexual reproduction, and method B illustrates asexual reproduction.

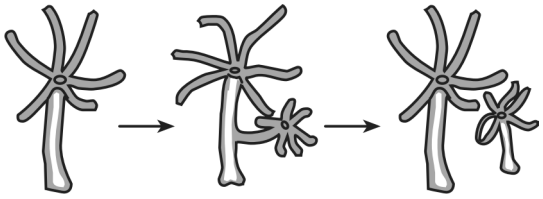
B. Offspring produced by method B will be genetically alike, but offspring produced by method A will be genetically different.

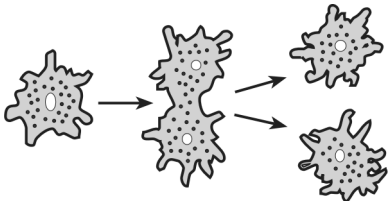
C. The two cells shown in the last step of method A are genetically alike, but the two cells shown in the last step of method B are genetically different.

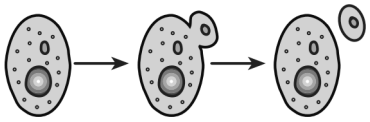
D. Offspring produced by method A will be genetically like the parent, but offspring produced by method B will be genetically different from the parents.

52. Which process usually results in offspring that exhibit new genetic variations?

A. 

B. 

C. 

D. 

53. Which sequence best represents sexual reproduction?

A. mitosis → gametes → zygote → fertilization

B. gametes → meiosis → mitosis → fertilization

C. fertilization → gametes → meiosis → zygote

D. meiosis → gametes → fertilization → zygote

54. A diploid cell of a normal human male contains

A. 22 autosomes and two *Y*-chromosomes

B. 22 pairs of autosomes and two *Y*-chromosomes

C. 22 pairs of autosomes, one *X*-chromosome, and one *Y*-chromosome

D. 22 autosomes and two *X*-chromosomes

55. The alleles for red hair and freckles are usually inherited together. Which statement best explains this pattern of inheritance?

A. Genes for these traits are linked.

B. Red hair and freckles are sex-linked traits.

C. Crossing-over has occurred.

D. Dominant alleles are always inherited together.

56. Which term refers to the orderly series of events that distributes one chromosome from each pair of homologous chromosomes in a primary sex cell to the nucleus of a gamete?

A. mitotic cell division

B. meiotic cell division

C. fission

D. deletion

57. Each body cell of a chimpanzee contains 48 chromosomes. How many chromosomes would normally be present in a gamete produced by this chimpanzee?

A. 24 B. 36 C. 48 D. 96

58. Meiotic cell division in animals is directly responsible for the

A. formation of gametes

B. fertilization of an egg

C. growth of a cell

D. production of muscle cells

59. Write one or more paragraphs that compare the two methods of reproduction, asexual and sexual.

Your answer must include at least:

- one similarity between the two methods
- one difference between the two methods
- one example of an organism that reproduces by asexual reproduction
- one example of an organism that reproduces by sexual reproduction

60. Compare asexual reproduction to sexual reproduction. In your comparison, be sure to include:

- which type of reproduction results in offspring that are usually genetically identical to the previous generation and explain why this occurs
- *one* other way these methods of reproduction differ