

**Biology: Science for Life with Physiology, 4e (Belk)**

**Chapter 20 Sex Differences and Athleticism: Endocrine, Skeletal, and Muscular Systems**

1) You're treating a patient who is abnormally short and find normal blood levels of growth hormone.

Based on this evidence, you determine that

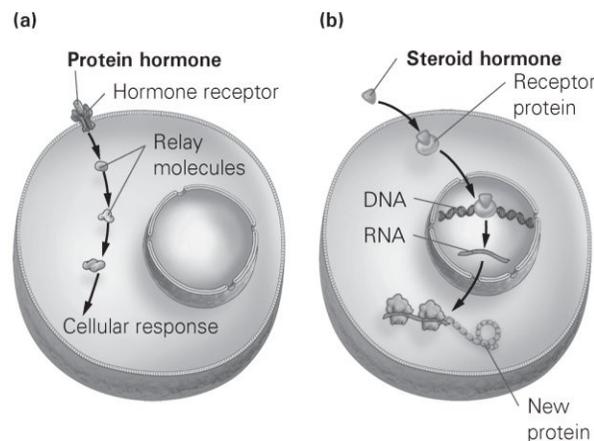
- A) the patient has a tumor in the pituitary gland.
- B) the patient lacks a functional pituitary gland.
- C) the patient lacks receptors for growth hormone.
- D) the patient lacks a functional circulatory system.

Answer: C

Diff: 3

Topic: 20.1

Skill: Applied



2) Consider the figure illustrating the two major classes of hormones and their actions. Which class of hormones would you expect to be ideally suited for long-term processes such as growth and development?

- A) Protein hormones, because they can relay messages.
- B) Steroid hormones, because they can turn specific genes on or off.
- C) Protein hormones, because they cannot cross cell membranes.
- D) Steroid hormones, because they can diffuse across cell membranes.

Answer: B

Diff: 3

Topic: 20.1

Skill: Conceptual

3) Which of the following endocrine glands is involved in producing immune cells?

- A) thyroid gland
- B) parathyroid glands
- C) thymus
- D) pancreas

Answer: C

Diff: 1

Topic: 20.1

Skill: Factual

4) A skydiving instructor and student jump out of an airplane. Which one will have higher blood levels of glucocorticoids?

- A) instructor
- B) student
- C) Neither will because glucocorticoid release is inhibited by high altitudes.
- D) Both will have equal blood concentrations of corticosteroids.

Answer: B

Diff: 2

Topic: 20.1

Skill: Applied

5) Diabetes insipidus is an inherited endocrine malfunction in which the kidneys fail to reabsorb normal amounts of water. Treatment of this disease involves replacing a missing hormone. Which of the following is the correct hormone to administer to this patient?

- A) glucagon
- B) insulin
- C) antidiuretic hormone (ADH)
- D) prolactin

Answer: C

Diff: 3

Topic: 20.1

Skill: Applied

6) A young person suffered a head injury that damaged her pituitary. As this person got older, she and her doctors found that the only thing that was unaffected by the injury was her

- A) growth.
- B) menstrual cycle.
- C) metabolic rate.
- D) blood sugar level.

Answer: D

Diff: 2

Topic: 20.1

Skill: Conceptual

7) Unlike most steroid-based hormones, protein hormones will typically

- A) bind to receptors on the surface of target cells.
- B) bind to receptors inside the target cells.
- C) bind to receptors in the nucleus of target cells.
- D) cause target cells to turn specific genes on and off.

Answer: A

Diff: 1

Topic: 20.1

Skill: Factual

8) Cells that respond to a particular hormone are referred to as \_\_\_\_\_ cells.

- A) glandular
- B) target
- C) receptive
- D) endocrine

Answer: B

Diff: 1

Topic: 20.1

Skill: Factual

9) It takes much longer for sex hormones and other steroids to produce their effects than it takes nonsteroid hormones. Why?

- A) Steroids are bigger, slower molecules.
- B) Steroids must usually be carried longer distances by the blood.
- C) Steroids must relay their messages via relay molecules.
- D) Steroids cause target cells to make new proteins, which takes time.

Answer: D

Diff: 3

Topic: 20.1

Skill: Conceptual

10) A patient is exhibiting symptoms that include lethargy, weight gain, and abnormal blood levels of calcium. Where does the patient potentially have a tumor?

- A) pancreas
- B) thyroid gland
- C) thymus
- D) parathyroid glands

Answer: B

Diff: 1

Topic: 20.1

Skill: Factual

11) You have just eaten a candy bar and your blood glucose levels are rising. This will activate which organ of the endocrine system?

- A) pancreas
- B) thyroid gland
- C) thymus
- D) parathyroid gland

Answer: A

Diff: 1

Topic: 20.1

Skill: Factual

12) Which of the following controls the activity of all the others?

- A) ovaries
- B) testes
- C) hypothalamus
- D) pituitary gland

Answer: C

Diff: 2

Topic: 20.1

Skill: Applied

13) An adult man lacking the hormone \_\_\_\_\_ would most likely exhibit a low sperm count and be infertile.

- A) LH
- B) FSH
- C) adrenaline
- D) estrogen

Answer: B

Diff: 1

Topic: 20.1

Skill: Factual

14) Suddenly, you find yourself in a situation in which someone is shooting live ammunition at you. Which of these hormones is likely to be one of the first secreted as a direct response to this situation?

- A) LH
- B) FSH
- C) epinephrine
- D) testosterone

Answer: C

Diff: 2

Topic: 20.1

Skill: Applied

15) Which of the following is a sign of puberty occurring in males?

- A) increased fat deposition
- B) breast development
- C) underarm hair growth
- D) widening of hips

Answer: C

Diff: 1

Topic: 20.1

Skill: Factual

16) You are a famous endocrinologist and are presented with a case in which a genetically determined male (XY) exhibits secondary female characteristics, including breast development and lack of facial hair growth. You hypothesize that this patient may

- A) lack receptors for testosterone.
- B) have a tumor in his testes causing an overproduction of testosterone.
- C) be abusing steroids.
- D) actually be perfectly healthy and normal.

Answer: A

Diff: 3

Topic: 20.1

Skill: Conceptual

17) True or false: Studies have shown that a woman's athletic performance is diminished during menstruation.

Answer: FALSE

Diff: 1

Topic: 20.1

Skill: Factual

18) True or false: In general, the first signs of puberty occur earlier in life for girls than for boys.

Answer: TRUE

Diff: 1

Topic: 20.1

Skill: Factual

19) True or false: Steroid-based hormones are able to move across cell membranes easily because they are water soluble.

Answer: FALSE

Diff: 2

Topic: 20.1

Skill: Applied

20) The \_\_\_\_\_ system is an internal system of regulation and communication involving hormones, glands, and target cells.

Answer: endocrine

Diff: 1

Topic: 20.1

Skill: Factual

21) The \_\_\_\_\_ produces immune cells and is part of the lymphatic system.

Answer: thymus

Diff: 1

Topic: 20.1

Skill: Factual

22) How is it that antidiuretic hormone (ADH) only exerts its actions on a small set of cells within the kidney?

- A) Only kidney cells have receptors for ADH.
- B) ADH does not encounter other body cells.
- C) Special proteins attach to ADH to prevent its action.
- D) ADH is made within the kidney, so it only acts locally.

Answer: A

Diff: 2

Topic: 20.1

Skill: Conceptual

23) You (assume you are male) were told by your mom not to wear tight briefs, as this could make you sterile and infertile. What did she mean by this statement?

- A) Testosterone does not act at body temperature.
- B) Testosterone cannot be produced at body temperature.
- C) Sperm production is reduced by excess pressure.
- D) Sperm production is reduced at body temperature.

Answer: D

Diff: 3

Topic: 20.1

Skill: Conceptual

24) You're treating a patient who experienced a fracture to her appendicular skeleton. Treatment of which of the following bones is indicated?

- A) skull
- B) vertebral column
- C) spine
- D) hip

Answer: D

Diff: 1

Topic: 20.2

Skill: Factual

25) Which of the following skeletal systems is ideally suited for organisms that live underground or float in water?

- A) hydrostatic
- B) endoskeleton
- C) exoskeleton
- D) appendicular

Answer: A

Diff: 1

Topic: 20.2

Skill: Factual

26) A tumor in an endocrine gland caused Jane to have weakened bones and unusually high levels of blood calcium. Which of the following was affected?

- A) parathyroid glands
- B) thyroid glands
- C) bone marrow
- D) pituitary gland

Answer: A

Diff: 2

Topic: 20.2

Skill: Applied

27) Marble bone disease is a disease in which bone increases in mass and becomes abnormally hard. This disorder is most likely caused by the inactivity of which part of the body?

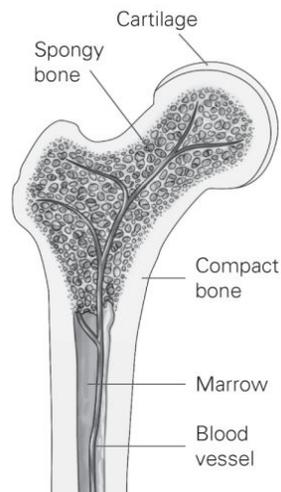
- A) bone marrow
- B) osteoblasts
- C) osteoclasts
- D) hinge joints

Answer: C

Diff: 3

Topic: 20.2

Skill: Applied



28) Refer to the figure to answer the following question: Which component of bone is responsible for producing blood cells?

- A) cartilage
- B) marrow
- C) spongy bone
- D) compact bone

Answer: B

Diff: 1

Topic: 20.2

Skill: Factual

29) A young athletic woman competing in the Olympics develops a pituitary tumor, which results in an excessive release of growth hormone. She experiences rapid linear growth, particularly with regards to her leg length. Which of the following sporting events would most likely be compromised as a result of this condition?

- A) soccer
- B) balance beam
- C) running
- D) long jump

Answer: B

Diff: 3

Topic: 20.2

Skill: Applied

30) Which of the following is an important function of the skeletal system?

- A) providing support for the body
- B) allowing communication between organs
- C) excreting waste substances
- D) utilizing energy from food

Answer: A

Diff: 1

Topic: 20.2

Skill: Factual

31) Which of the following is part of the axial skeleton?

- A) skull
- B) legs
- C) arms
- D) hips

Answer: A

Diff: 1

Topic: 20.2

Skill: Factual

32) The joint that allows us to shake our head "no" must be a \_\_\_\_\_ joint.

- A) hinge
- B) ball-and-socket
- C) pivot
- D) hinge and pivot

Answer: C

Diff: 1

Topic: 20.2

Skill: Applied

33) Which is a ball-and-socket joint?

- A) lower jaw with skull
- B) skull with first vertebra
- C) elbow
- D) shoulder

Answer: D

Diff: 2

Topic: 20.2

Skill: Conceptual

34) What might be a major disadvantage of having a ball-and-socket joint, rather than a hinge joint, in the human knee?

- A) decreased strength
- B) decreased joint stability
- C) decreased joint flexibility
- D) decreased jumping ability

Answer: B

Diff: 3

Topic: 20.2

Skill: Applied

35) Which of the following components of bone tissue forms the hard outer shell of bones?

- A) bone marrow
- B) compact bone
- C) spongy bone
- D) cartilage

Answer: B

Diff: 1

Topic: 20.2

Skill: Factual

36) The endocrine glands involved in calcium homeostasis are

- A) thyroid and parathyroid.
- B) hypothalamus and pituitary.
- C) thyroid and pancreas.
- D) hypothalamus and adrenal gland.

Answer: A

Diff: 1

Topic: 20.2

Skill: Factual

37) What is a correct statement about the function of the hormones involved in blood calcium homeostasis?

A) Parathyroid hormone stimulates calcium deposit in bones and increases calcium uptake in the kidneys.

B) A falling blood calcium level causes the thyroid to release calcitonin.

C) Calcitonin acts to lower blood calcium levels, and parathyroid hormone acts to raise blood calcium.

D) Both parathyroid hormone and calcitonin act to raise blood calcium levels.

Answer: C

Diff: 3

Topic: 20.2

Skill: Applied

38) Men bring more power to activities than women because

A) men have a greater center of balance.

B) men have longer legs and arms and therefore can generate more force.

C) men have shorter legs than woman.

D) men have a higher center of gravity.

Answer: B

Diff: 2

Topic: 20.2

Skill: Applied

39) Which of the following represents bones that do not differ between males and females of similar sizes?

A) mandible

B) temporal bones

C) vertebral column

D) frontal bone

Answer: C

Diff: 1

Topic: 20.2

Skill: Factual

40) True or false: Because women have a broader pelvis, their Q angle is smaller than the Q angle in men.

Answer: FALSE

Diff: 2

Topic: 20.2

Skill: Applied

41) True or false: Because of generally larger Q angles, women may be more susceptible to knee injuries than men.

Answer: TRUE

Diff: 2

Topic: 20.2

Skill: Applied

42) True or false: From infancy to adulthood, a large proportion of human growth occurs in the extremities as compared to the torso.

Answer: TRUE

Diff: 2

Topic: 20.2

Skill: Factual

43) A human's soft internal organs are protected by the \_\_\_\_\_ skeleton.

Answer: axial

Diff: 1

Topic: 20.2

Skill: Factual

44) While \_\_\_\_\_ are involved in bone deposition, \_\_\_\_\_ are involved in the breakdown of bone tissue.

Answer: osteoblasts, osteoclasts

Diff: 2

Topic: 20.2

Skill: Factual

45) Why are women more proficient than men on the balance beam apparatus used in gymnastics?

A) Women have a higher center of gravity because their legs are long relative to their torsos.

B) Women have a lower center of gravity because their arms are long relative to their legs.

C) Women have a higher center of gravity because their arms are long relative to their torsos.

D) Women have a lower center of gravity because their torsos are long relative to leg length.

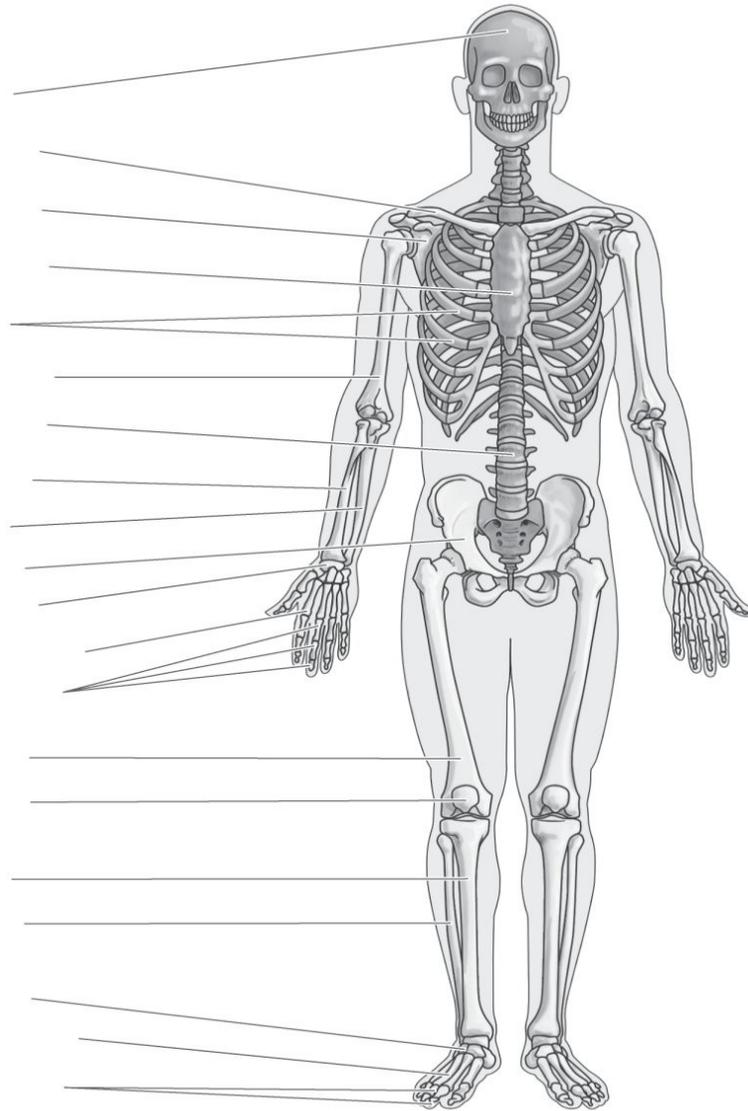
Answer: D

Diff: 2

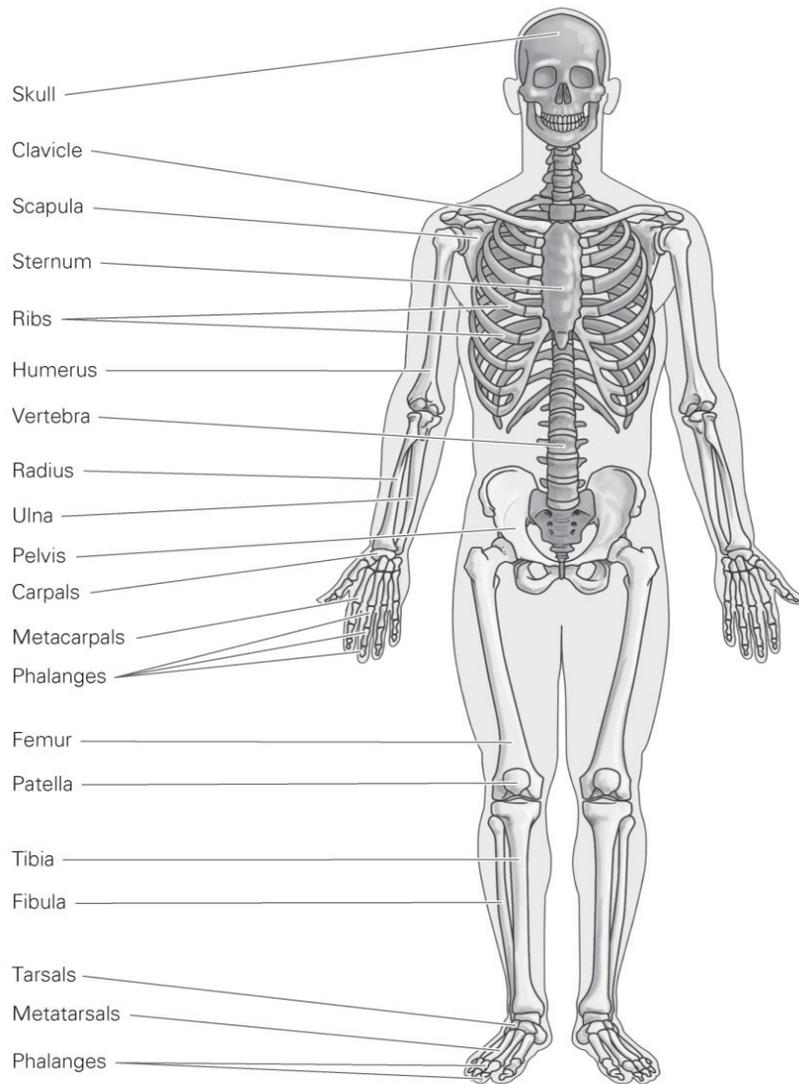
Topic: 20.2

Skill: Applied

46) Label the parts of the human skeleton.



Answer:



Diff: 2

Topic: 20.2

Skill: Factual

47) Earthworms and sea anemones do not have bones. They move by the actions of muscles on a fluid-filled compartment. This system is called a(n)

- A) endoskeleton.
- B) hydrostatic skeleton.
- C) circular skeleton.
- D) longitudinal skeleton.

Answer: B

Diff: 1

Topic: 20.2

Skill: Factual

48) Which of the major types of muscle in humans has a primary function in movement?

- A) smooth
- B) cardiac
- C) skeletal
- D) endothelial

Answer: C

Diff: 1

Topic: 20.3

Skill: Factual

49) A pitcher throws a baseball by lowering the forearm to straighten the arm. During this movement, the biceps muscle \_\_\_\_\_ and the triceps muscle \_\_\_\_\_.

- A) contracts; relaxes
- B) relaxes; contracts
- C) relaxes; relaxes
- D) contracts; contracts

Answer: B

Diff: 1

Topic: 20.3

Skill: Factual

50) A person who excels at weight lifting but does NOT do well at running marathons probably has leg muscles containing a large percentage of \_\_\_\_\_ fibers.

- A) slow-twitch
- B) fast-twitch
- C) intermediate
- D) high-density

Answer: B

Diff: 2

Topic: 20.3

Skill: Applied

51) Which of the following statements best describes the way that a sarcomere shortens using the sliding filament mechanism of muscle contraction?

- A) Actin and myosin filaments shorten and slide past each other.
- B) As they slide past each other, actin filaments shorten, while myosin filaments do not shorten.
- C) Actin and myosin filaments do not shorten, but they do slide past each other.
- D) As they slide past each other, myosin filaments shorten, while actin filaments do not shorten.

Answer: C

Diff: 2

Topic: 20.3

Skill: Applied

52) The striated appearance of skeletal muscle is due to the

- A) dark color of myosin.
- B) dense array of microtubules.
- C) dense packing of ATP molecules.
- D) regular arrangement of myofibrils.

Answer: D

Diff: 2

Topic: 20.3

Skill: Applied

53) True or false: The larger muscle fibers found in males account for the fact that males tend to be, on average, stronger than females.

Answer: TRUE

Diff: 2

Topic: 20.3

Skill: Applied

54) Which of the following types of muscle in humans is involved in voluntary body movements?

- A) skeletal
- B) cardiac
- C) smooth
- D) endothelial

Answer: A

Diff: 1

Topic: 20.3

Skill: Factual

55) Arm and leg muscles are arranged in antagonistic pairs. How does this affect their functioning?

- A) It provides a backup if one of the muscles is injured.
- B) One muscle of the pair pushes while the other pulls.
- C) It allows the muscles to produce opposing movements.
- D) It allows one group of muscles to be composed of fast-twitch fibers and the other to have slow-twitch fibers.

Answer: C

Diff: 3

Topic: 20.3

Skill: Applied

56) Which muscle component is smallest?

- A) myofibril
- B) myosin filament
- C) sarcomere
- D) muscle fiber

Answer: B

Diff: 2

Topic: 20.3

Skill: Factual

57) The myofibrils of skeletal muscle are organized into units called

- A) A discs.
- B) sarcomeres.
- C) Z discs.
- D) antagonistic pairs.

Answer: B

Diff: 1

Topic: 20.3

Skill: Factual

58) Without the protein myosin, a muscle would lack

- A) ribosomes.
- B) mitochondria.
- C) thin filaments.
- D) thick filaments.

Answer: D

Diff: 1

Topic: 20.3

Skill: Factual

59) Muscle contraction occurs when a sarcomere

- A) shortens.
- B) lengthens.
- C) remains the same.
- D) lengthens then shortens.

Answer: A

Diff: 1

Topic: 20.3

Skill: Factual

60) In general, males have a greater muscle mass than females because they produce greater quantities of

- A) adrenaline.
- B) testosterone.
- C) estrogen.
- D) growth hormone.

Answer: B

Diff: 1

Topic: 20.3

Skill: Factual

61) When a person dies, muscles become rigid and fixed in position. This is a condition known as *rigor mortis*. Rigor mortis occurs because

- A) ATP is not available to release myosin heads from actin filaments.
- B) muscle fibers break down quickly in the absence of oxygen.
- C) ATP is not available to cause sarcomeres to shorten.
- D) the human skeletal system locks together after death.

Answer: A

Diff: 3

Topic: 20.3

Skill: Conceptual

62) Studies have demonstrated that in some cases, female marathon runners don't exhibit a normal menstrual cycle. This could be explained by the fact that such women

- A) have too much body fat.
- B) have low levels of growth hormone.
- C) release too much testosterone.
- D) do not have enough body fat.

Answer: D

Diff: 3

Topic: 20.4

Skill: Conceptual

63) Due to body fat differences, which of the following sports gives women an advantage over men?

- A) soccer
- B) hurdles
- C) swimming
- D) weight lifting

Answer: C

Diff: 2

Topic: 20.4

Skill: Applied

64) When working out with his wife, Ed has noticed he has to drink much more Gatorade than his wife does following their workouts. This could be explained by the fact that during exercise, females

- A) utilize glucose more efficiently than males.
- B) utilize more fat to produce energy than males.
- C) effectively increase their glucose metabolism during exercise compared to males.
- D) store more body sugars than males.

Answer: B

Diff: 3

Topic: 20.4

Skill: Conceptual

65) Which of the following statements could account for the reason males may have an advantage over females when it comes to events requiring a high level of intensity over a short-time period?

- A) Women have smaller hearts than men.
- B) Men are generally taller than women.
- C) Men have higher blood pressure than women.
- D) Women have a greater percentage of body fat than men.

Answer: A

Diff: 2

Topic: 20.4

Skill: Factual

66) When studying the differences between various human groups, it's often found that the differences within a group (individual-based) are \_\_\_\_\_ the differences between two groups (group-based).

- A) less than
- B) greater than
- C) the same as
- D) negligible to

Answer: B

Diff: 2

Topic: 20.4

Skill: Factual

67) True or false: Studies have shown that in addition to the physiological benefits of exercising, an additive benefit may be decreased anxiety and depression.

Answer: TRUE

Diff: 1

Topic: 20.4

Skill: Factual

68) Mary is a long-distance runner and trains regularly. Recently, Mary and her husband have unsuccessfully tried to conceive a child. To improve her chances of getting pregnant, her doctor suggests she should stop training because excessive exercise may

- A) lengthen the menstruation cycle.
- B) cause menstruation to cease.
- C) lead to excessive levels of estrogen and progesterone.
- D) increase fat deposition, thereby decreasing fertility.

Answer: B

Diff: 3

Topic: 20.4

Skill: Applied

69) Teri brings her husband, Liam, with her to the gym and signs them both up for a one-hour aerobics class. After 20 minutes, Liam is visibly fatigued, even though he is a regular at the gym, lifting weights and playing basketball. What might explain why he is fatigued while his wife, although working hard, is not struggling?

- A) Females use more fat for energy and endurance exercises.
- B) Males have very little fat from which to obtain energy during endurance exercises.
- C) Males are better at team sports than at individual exercise programs.
- D) Teri's husband must not have eaten before coming to the gym.

Answer: A

Diff: 3

Topic: 20.4

Skill: Applied

70) Beth has trained extensively to get ready for a big swimming event. She has developed her muscle mass to increase her strength so she can surpass those male competitors who have longer arms and legs than she does. To keep those muscles working in top form, she must supply them with enough oxygen to help them produce energy. Why does Beth have an additional physical obstacle to overcome before she can beat her male competitors?

- A) Her heart and lungs are most likely smaller than her male competitors' and have to work harder.
- B) Beth's athletic ability changes with her menstrual cycle.
- C) No matter what Beth does, she will always be physically inferior to men.
- D) If the swim event is an endurance race, her fat metabolism differences put her at a disadvantage.

Answer: A

Diff: 3

Topic: 20.4

Skill: Applied

71) If healthy men have a range of body fat from 3-29% and healthy women have a range of body fat from 12-32%, what would you predict for the sex of an individual having 20% body fat?

- A) The individual is male.
- B) The individual is female.
- C) The individual's sex can't be predicted from body fat percentage.
- D) No one has 20% body fat.

Answer: C

Diff: 2

Topic: 20.4

Skill: Applied

72) True or false: To truly understand the whole story of athleticism and gender, one must consider cultural factors.

Answer: TRUE

Diff: 1

Topic: 20.4

Skill: Applied

73) True or false: Studies have shown that children of both sexes who participate in sports are less likely to drop out of high school, smoke, or drink.

Answer: TRUE

Diff: 1

Topic: 20.4

Skill: Factual