

## This is a practice test.

**Give your best answers and then look up the answer in the Text Book.**

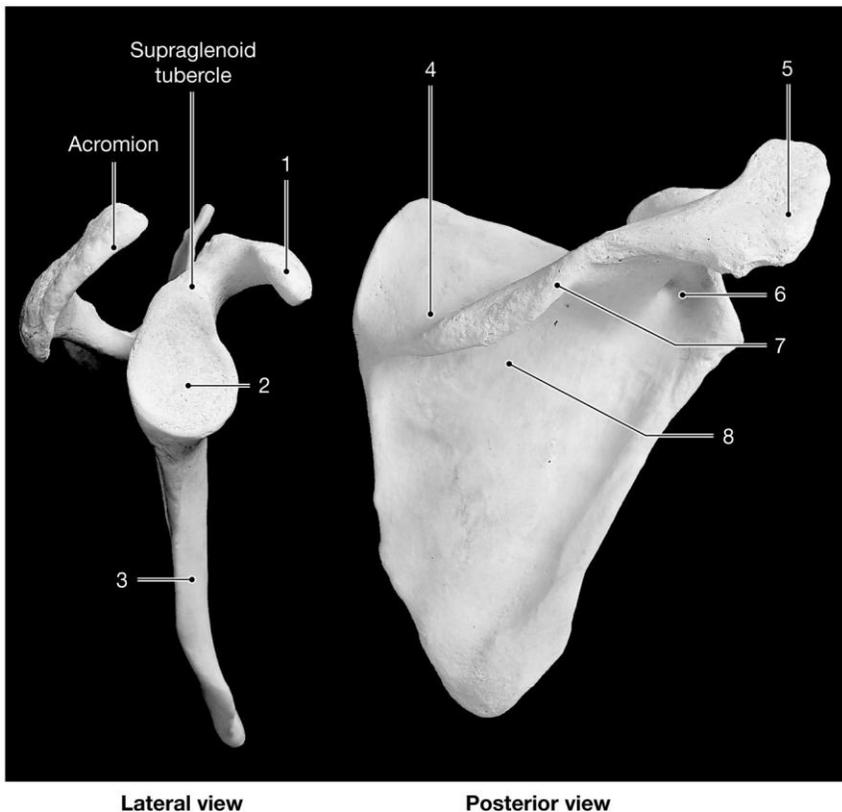
**MULTIPLE CHOICE.** Choose the one alternative that best completes the statement or answers the question.

1) The largest component of the coxal bone is the

- A) pubis.
- B) tibia.
- C) ilium.
- D) femur.
- E) ischium.

2) The lateral malleolus is found on the

- A) tibia.
- B) fibula.
- C) patella.
- D) femur.
- E) calcaneus.



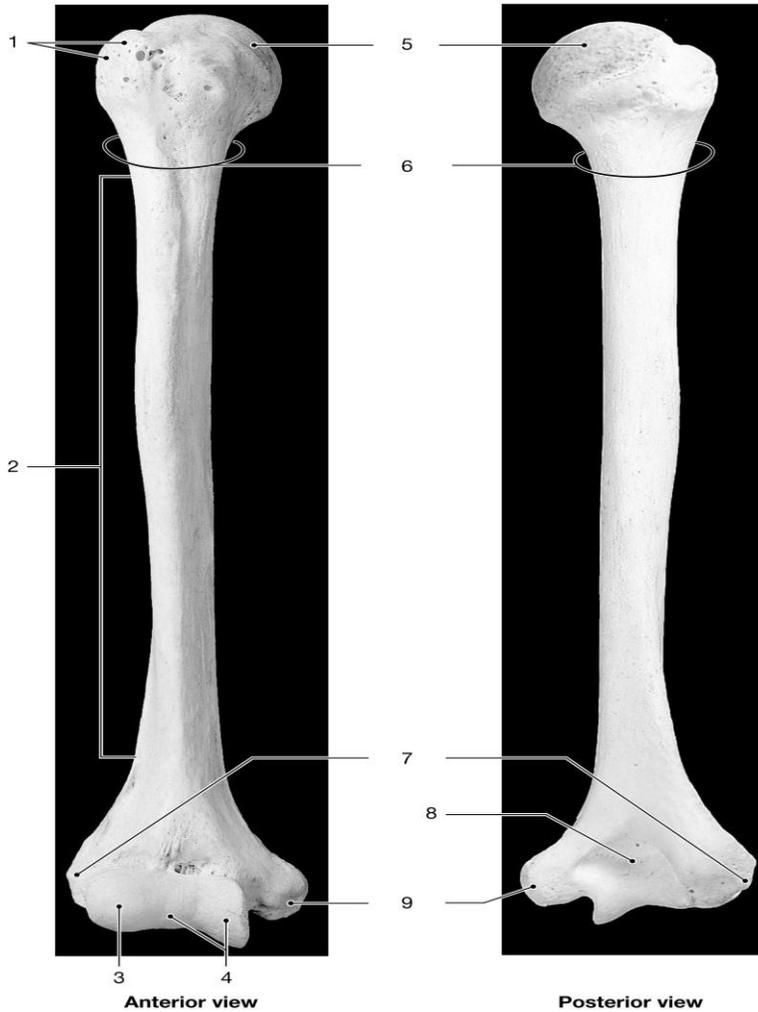
**Figure 8-1 The Scapula**

*Use Figure 8-1 to answer the following questions:*

3) Which structure is the acromion?

- A) 5
- B) 3
- C) 2
- D) 4
- E) 1

- 4) The foot has \_\_\_\_\_ ankle bones and \_\_\_\_\_ bones in the sole.
- A) 7; 5
  - B) 5; 5
  - C) 8; 4
  - D) 4; 5
  - E) 8; 5



**Figure 8-2 The Humerus**

*Use Figure 8-2 to answer the following questions:*

- 5) Which structure articulates with the glenoid cavity?
- A) 5
  - B) 7
  - C) 4
  - D) 3
  - E) 6
- 6) The clavicle articulates with the scapula
- A) distally with the manubrium.
  - B) proximally with the coracoid cavity.
  - C) distally with the coracoid process.
  - D) distally with the acromion.
  - E) distally with the glenoid cavity.

7) Which of these surface features occur on the ulna?

- A) trochlear notch
- B) radial notch
- C) styloid process
- D) olecranon
- E) All of the answers are correct.

8) The pelvic organs are mostly found within the

- A) ischial spine.
- B) pubic symphysis.
- C) obturator foramen.
- D) iliac fossa.
- E) ischial fossa.

9) The hand has \_\_\_\_\_ wrist and \_\_\_\_\_ palm bones.

- A) 5; 5
- B) 10; 5
- C) 8; 5
- D) 4; 5
- E) 8; 4

10) The clavicle articulates with the

- A) glenoid cavity and scapular spine.
- B) acromial and coracoid processes.
- C) manubrium and xiphoid process.
- D) acromial process and the manubrium.
- E) coracoid process and the humerus.

11) On a field trip you discover a skeleton with the following characteristics: the acetabulum is directed laterally, the ischial spine points medially, and the angle inferior to the pubic symphysis is less than 90 degrees. The long bones of the arms and legs are relatively light and show epiphyseal plates. This skeleton is probably from

- A) a young male.
- B) an elderly female.
- C) a young female.
- D) an elderly male.
- E) cannot tell on the basis of this information

12) The tarsus contains \_\_\_\_\_ bones.

- A) 8
- B) 5
- C) 7
- D) 4
- E) 6

13) The head of the humerus articulates with the

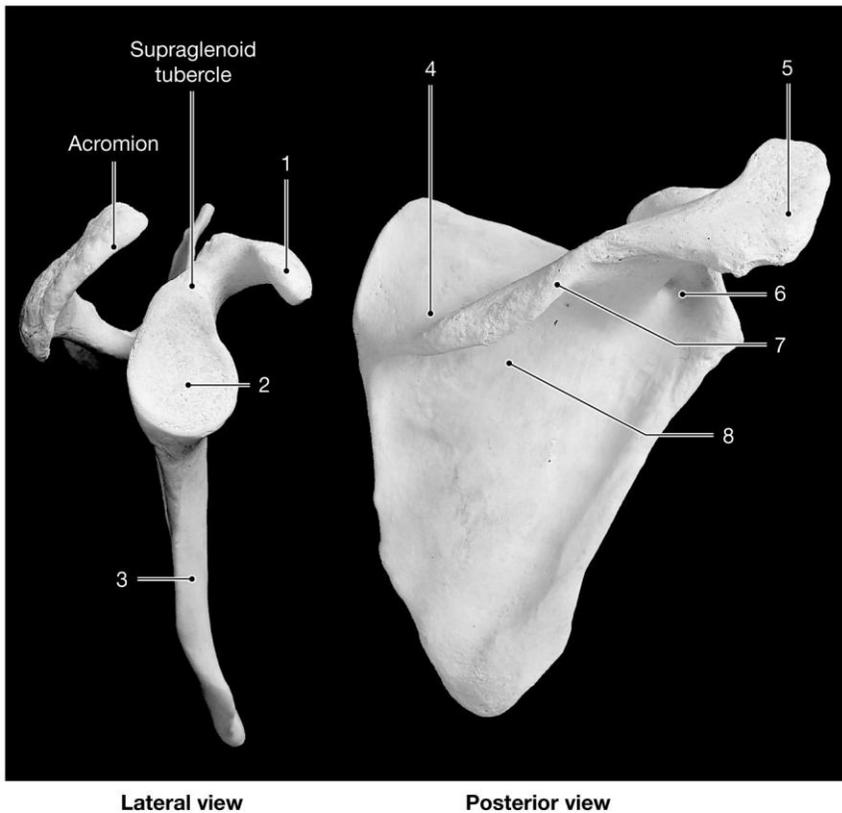
- A) carpal bones.
- B) trochlear notch.
- C) coxal bone.
- D) glenoid cavity.
- E) acetabulum.

14) The bones that form the fingers are the

- A) metacarpals.
- B) carpals.
- C) phalanges.
- D) tarsals.
- E) metatarsals.

15) The scapula is roughly triangular in shape. Which of the following are correct terms for the borders?

- A) scapular and clavicular borders
- B) superior, medial, and lateral borders
- C) pectoral borders
- D) dorsal and costal borders
- E) anterior and posterior borders



**Figure 8-1 The Scapula**

*Use Figure 8-1 to answer the following questions:*

16) Identify the structure labeled "7."

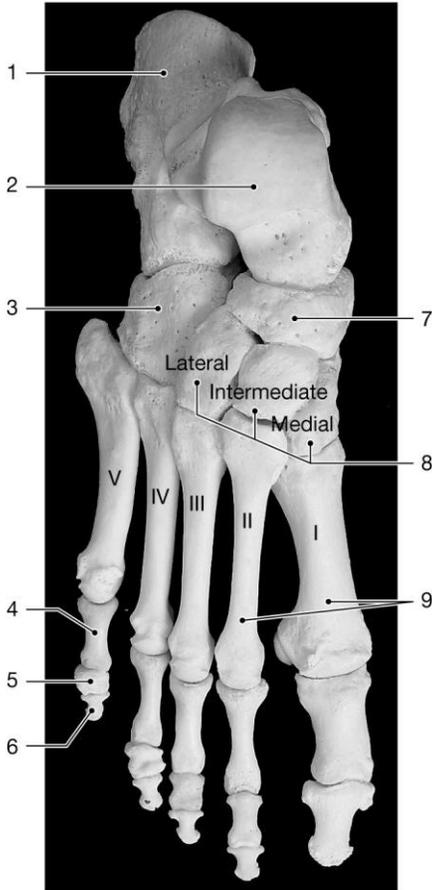
- A) coracoid process
- B) scapular process
- C) scapular notch
- D) acromion
- E) spine

17) Identify the structure labeled "1."

- A) acromion
- B) scapular notch
- C) scapular process
- D) spine
- E) coracoid process

18) The \_\_\_\_\_ of the radius helps stabilize the wrist joint.

- A) coronoid process
- B) radial tuberosity
- C) capitulum
- D) olecranon process
- E) styloid process



**Figure 8-4 Bones of the Ankle and Foot**

*Use Figure 8-4 to answer the following questions:*

19) Identify the bones named for their wedge shape.

- A) 3
- B) 8
- C) 1
- D) 2
- E) 7

20) The weight of the body is supported by the

- A) distal ends of the metatarsals.
- B) distal metacarpals and the calcaneus.
- C) proximal metatarsals.
- D) calcaneus.
- E) distal metacarpals.

21) A male has a \_\_\_\_\_ pelvic outlet when compared to the woman's pelvic outlet.

- A) longer

- B) larger
- C) smaller
- D) wider
- E) deeper

22) Each hand has \_\_\_\_\_ phalangeal bones.

- A) 20
- B) 15
- C) 10
- D) 18
- E) 14

23) Each coxal bone consists of the following three fused bones:

- A) ulna, radius, and humerus
- B) femur, tibia, and fibula
- C) ilium, ischium, and pubis
- D) femur, patella, and tibia
- E) hamate, capitate, and trapezium

24) There are \_\_\_\_\_ carpal bones located in the wrist, which form \_\_\_\_\_ rows of bones in the wrist.

- A) 2; 8
- B) 8; 2
- C) 10; 3
- D) 6; 2
- E) 4; 2

25) The coxal bone and sacrum combine to form the

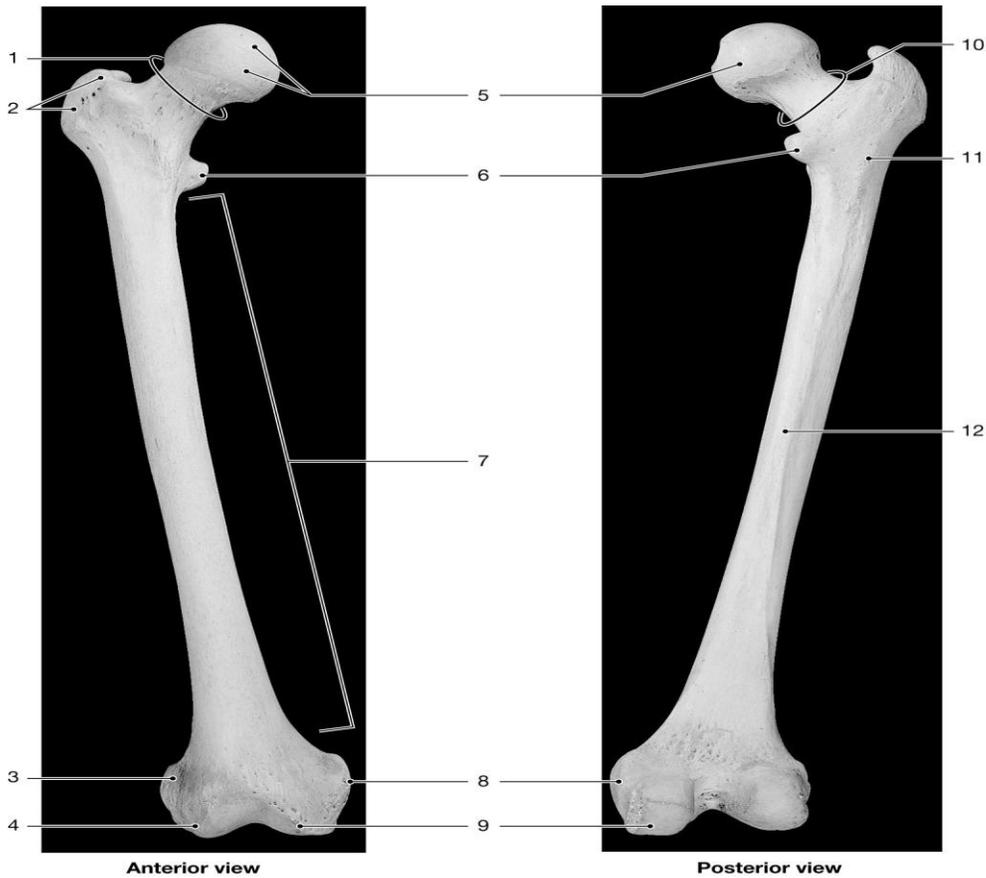
- A) hips.
- B) pectoral girdle.
- C) pubic symphysis.
- D) pelvis.
- E) pelvic girdle.

26) The hand has 15 phalangeal bones; the foot has 14 phalangeal bones.

- A) The first statement is true but the second statement is false.
- B) The first statement is true and the second statement is true.
- C) The first statement is false and the second statement is false.
- D) The first statement is false but the second statement is true.
- E) too much anatomical variability to be sure

27) The patella slides in a groove on the femur called the

- A) interpatellar groove.
- B) medial and lateral condyles.
- C) patellar surface.
- D) femoral head.
- E) patellar canal.



**Figure 8-3 The Femur**

*Use Figure 8-3 to answer the following questions:*

28) Identify the structure labeled "2."

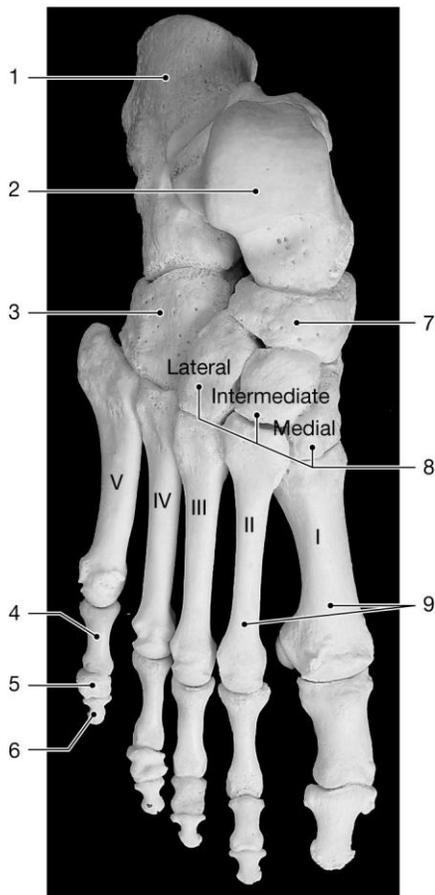
- A) lateral condyle
- B) linea aspera
- C) head
- D) lateral epicondyle
- E) greater trochanter

29) Compared to the male pelvis, the female pelvis

- A) has deep acetabula.
- B) is larger.
- C) has a thicker ischial tuberosity.
- D) has a greater angle inferior to the pubic symphysis.
- E) is heavier.

30) The bones that form the palm are the

- A) metacarpals.
- B) tarsals.
- C) carpals.
- D) phalanges.
- E) metatarsals.



**Figure 8-4 Bones of the Ankle and Foot**

*Use Figure 8-4 to answer the following questions:*

31) Identify the bone labeled "1."

- A) cuboid
- B) talus
- C) calcaneus
- D) cuneiform V
- E) metatarsal

32) Which of the following is **not** a part of the pelvis?

- A) lumbar vertebrae
- B) coccyx
- C) sacrum
- D) coxal bone
- E) pubic symphysis

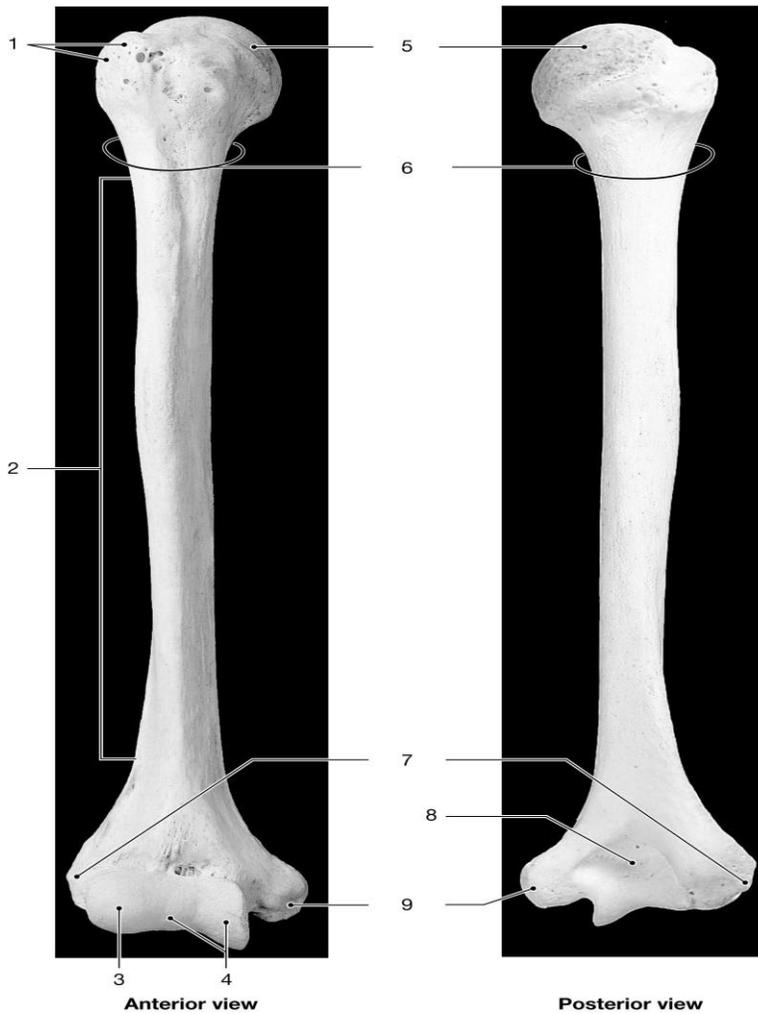
33) The part of the tibia that is easily felt through the skin is and is known as the shin is the

- A) anterior margin.
- B) medial malleolus.
- C) articular facet.
- D) anterior crest.
- E) tibial tuberosity.

34) Tom stumbles and injures his hallux. What part of his anatomy is injured?

- A) his hip
- B) his hand

- C) his ankle
- D) his foot
- E) his knee



**Figure 8-2 The Humerus**

*Use Figure 8-2 to answer the following questions:*

35) Identify the structure labeled "9."

- A) lateral epicondyle
- B) olecranon process
- C) greater tubercle
- D) trochlea
- E) medial epicondyle

36) The depression on the posterior surface at the distal end of the humerus is the

- A) radial groove.
- B) intertubercular groove.
- C) coronoid fossa.
- D) radial fossa.
- E) olecranon fossa.

37) Which of the following is a **not** characteristic of the female pelvis?

- A) bone markings not very prominent
- B) triangular obturator foramen

- C) coccyx points anteriorly
- D) sacrum broad and short
- E) ischial spine points posteriorly

38) The clearest distinction between a male and female skeleton is seen in the characteristics of the

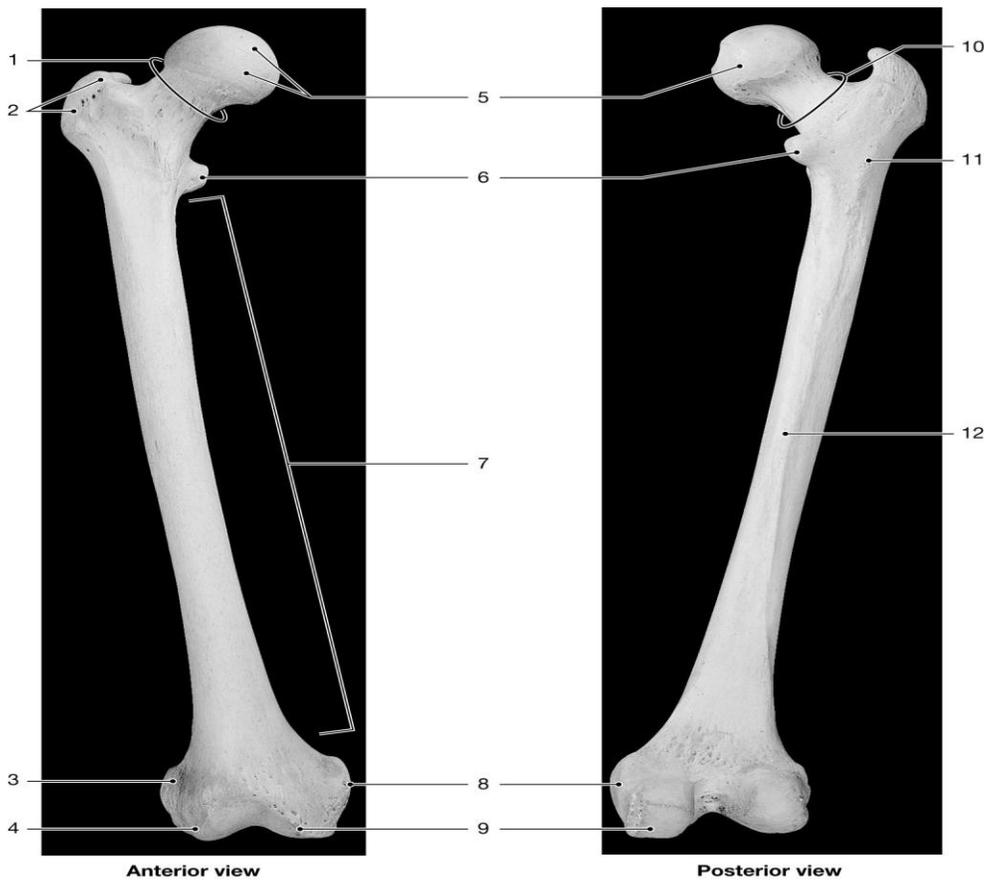
- A) thoracic cage.
- B) pelvis.
- C) skull.
- D) teeth.
- E) sacrum.

39) Which of the following is located closest to the jugular notch?

- A) medial end of clavicle
- B) xiphoid process
- C) lateral end of scapula
- D) lateral end of clavicle
- E) medial end of scapula

40) The bones that give the hand a wide range of motion are the

- A) carpals.
- B) tarsals.
- C) phalanges.
- D) metacarpals.
- E) metatarsals.



**Figure 8-3 The Femur**

*Use Figure 8-3 to answer the following questions:*

41) Which structure articulates with the acetabulum?

- A) 4
- B) 1
- C) 9
- D) 5
- E) 2

42) The longest and heaviest bone in the body is the

- A) humerus.
- B) coxal bone.
- C) tibia.
- D) fibula.
- E) femur.

43) The medial border of the fibula is bound to the \_\_\_\_\_ by the interosseous membrane.

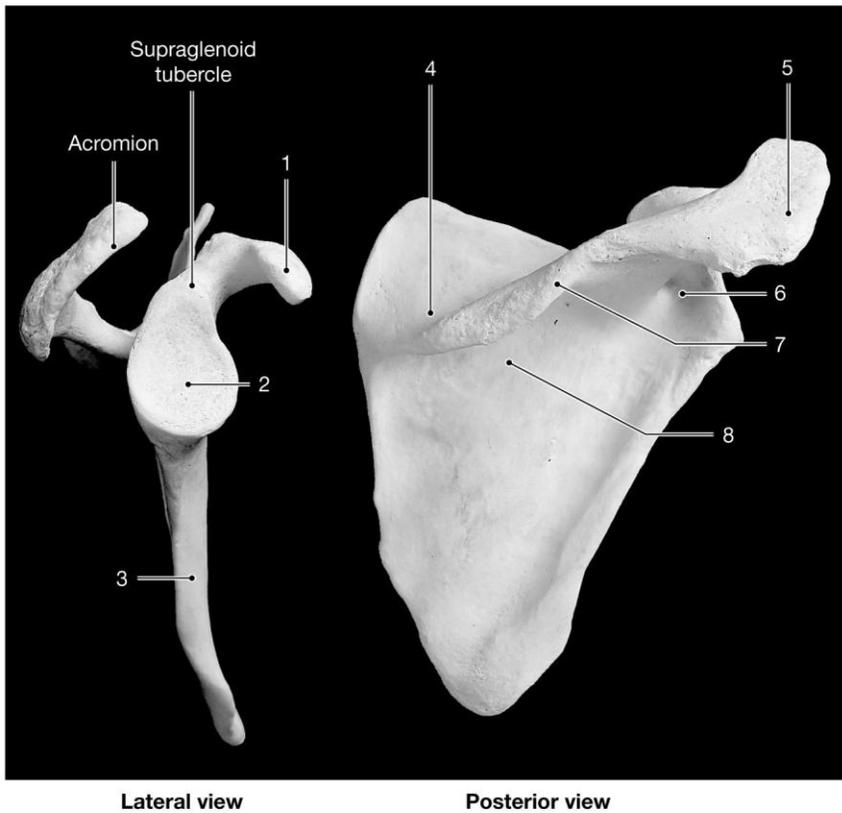
- A) patella
- B) navicular
- C) tibia
- D) femur
- E) femur and the tibia

44) Which of the following is **not** an age-related change in the skeleton?

- A) appearance of major vertebral curves
- B) bone remodeling
- C) closure of the fontanelles
- D) fusion of the coxal bones
- E) reduction in mineral content

45) Which of these adapts the pectoral girdle to a wide range of movement?

- A) relatively weak joints
- B) strong joint between scapula and ribs
- C) tough ligaments and tendons
- D) heavy bones
- E) flexible sternum



**Figure 8-1 The Scapula**

*Use Figure 8-1 to answer the following questions:*

46) What bone articulates on the structure labeled "2"?

- A) humerus
- B) manubrium
- C) clavicle
- D) radius
- E) femur

47) The condition known as "flat feet" is due to a lower-than-normal longitudinal arch in the foot. A problem with which of the following would most likely contribute to this condition?

- A) weakness in the ligaments that attach the talus to the tibia
- B) a loose Achilles tendon
- C) weakness in the ligaments that attach the calcaneus to the distal ends of the metatarsals
- D) poor alignment of the phalanges with the metatarsals
- E) weak tarsometatarsal joints

48) The sacrum articulates with the

- A) ilium and ischium.
- B) pubis.
- C) ischium.
- D) ilium.
- E) ischium and pubis.

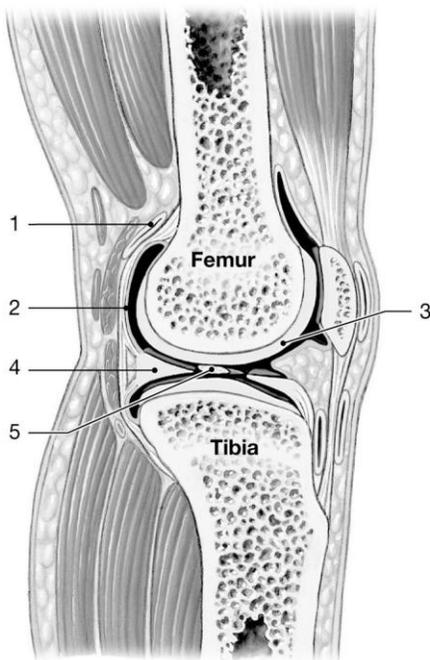
49) Study of human skeletons can reveal information concerning the person's

- A) age and nutritional status.
- B) health.
- C) sex.
- D) size and handedness.

E) All of the answers are correct.

50) The condyle of the humerus consists of the

- A) capitulum and coronoid process.
- B) medial and lateral epicondyles.
- C) trochlea and olecranon fossa.
- D) head and neck.
- E) capitulum and trochlea.



**Sagittal section**

**Figure 9-2 A Simplified Sectional View of the Knee Joint**

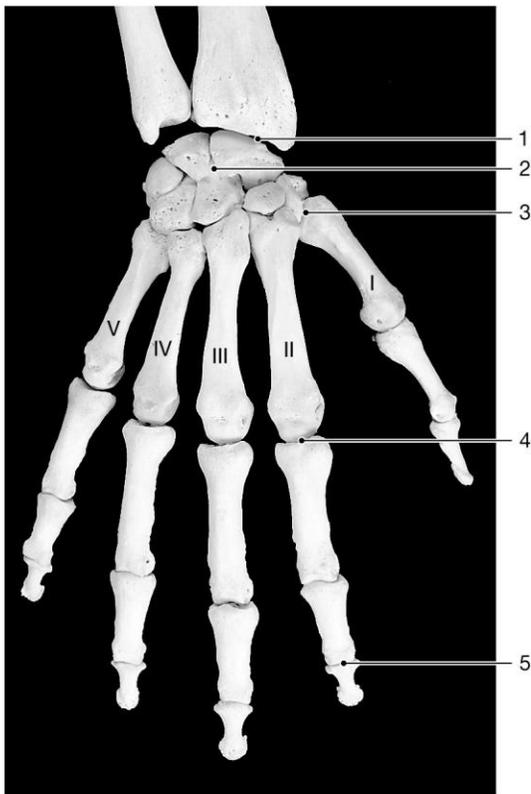
*Use Figure 9-2 to answer the following questions:*

51) What type of tissue occurs at the structure labeled "3"?

- A) bone tissue
- B) synovial membrane
- C) dense connective tissue
- D) fibrocartilage
- E) articular cartilage

52) Which of the following is **not** a characteristic of articular cartilage?

- A) The matrix contains more water than other cartilages.
- B) It secretes synovial fluid.
- C) Surfaces are normally slick and smooth.
- D) It is composed cartilage similar to hyaline cartilage.
- E) There is no perichondrium.



Posterior view

**Figure 9-1 Bones of the Wrist and Hand**

*Use Figure 9-1 to answer the following questions:*

53) Identify the type of joint at label "1."

- A) condylar
- B) gliding
- C) hinge
- D) pivot
- E) saddle

54) The radiocarpal joint is a(n) \_\_\_\_\_ joint.

- A) immovable
- B) condylar
- C) hinge
- D) saddle
- E) gliding

55) Dense connective tissue is to a suture as a periodontal ligament is to a(n)

- A) amphiarthrosis.
- B) syndesmosis.
- C) gomphosis.
- D) synchondrosis.
- E) synostosis.

56) To pinch with a thumb and finger involves a movement called

- A) circumduction.
- B) eversion.
- C) opposition.
- D) retraction.

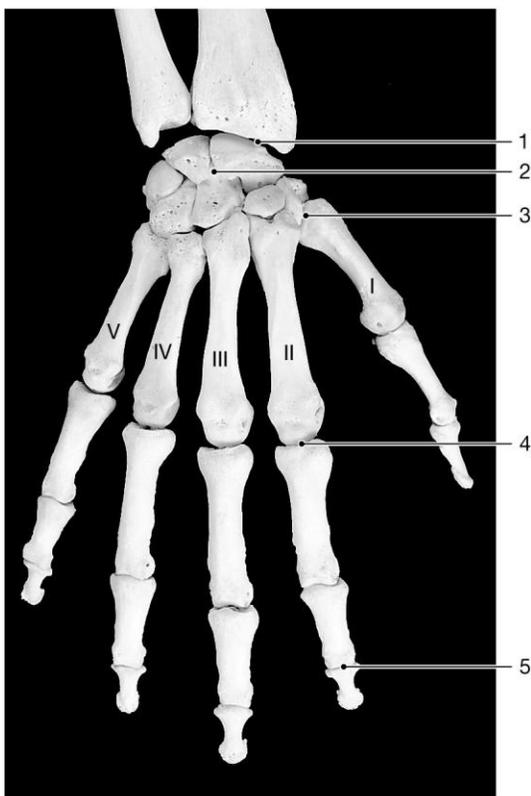
E) rotation.

57) Which of the following athletes are at greatest risk of developing a rotator cuff injury?

- A) high jumpers
- B) soccer players
- C) tennis players
- D) runners
- E) baseball pitchers

58) All of the following are structural classifications of synovial joints, **except**

- A) gliding.
- B) hinge.
- C) rolling.
- D) pivot.
- E) saddle.



Posterior view

**Figure 9-1 Bones of the Wrist and Hand**

*Use Figure 9-1 to answer the following questions:*

59) Identify the type of joint at label "5."

- A) condylar
- B) hinge
- C) gliding
- D) pivot
- E) saddle

60) Joints can be classified structurally as

- A) cartilaginous.
- B) bony.

- C) fibrous.
- D) synovial.
- E) All of the answers are correct.

61) The structures that assist the bursae in reducing friction between the patella and other tissues are the

- A) medial menisci.
- B) lateral menisci.
- C) cruciate ligaments.
- D) fat pads.
- E) popliteal ligaments.

62) A movement away from the midline of the body is termed

- A) abduction.
- B) adduction.
- C) flexion.
- D) inversion.
- E) extension.

63) The largest and strongest articulation at the elbow is the

- A) ulnar radial joint.
- B) humeroradial joint.
- C) radial joint.
- D) ulnar joint.
- E) humero-ulnar joint.

64) The joint between the trapezium and metacarpal bone of the thumb is an example of a(n) \_\_\_\_\_ joint.

- A) gliding
- B) condylar
- C) pivot
- D) hinge
- E) saddle

65) Which of the following is **not** a property of synovial joints?

- A) covered by a capsule
- B) freely movable
- C) covered by a serous membrane
- D) contain synovial fluid
- E) lined by a secretory epithelium

66) Factors that increase the stability of the hip joint include

- A) almost complete bony socket.
- B) supporting ligaments.
- C) tough capsule.
- D) strong muscular padding.
- E) All of the answers are correct.

67) A slightly movable joint is a(n)

- A) synarthrosis.
- B) gomphosis.
- C) diarthrosis.
- D) synostosis.
- E) amphiarthrosis.

68) A suture is an example of a(n)

- A) amphiarthrosis.
- B) synarthrosis.
- C) syndesmosis.
- D) symphysis.
- E) diarthrosis.

69) An example of a synchondrosis is the articulation of the

- A) atlas and the axis.
- B) femur with the acetabulum.
- C) radius and the ulna.
- D) navicular bone with the cuneiform bones.
- E) ribs with the sternum.

70) The elbow joint is an example of a(n) \_\_\_\_\_ joint.

- A) condylar
- B) gliding
- C) pivot
- D) hinge
- E) saddle

71) Which of these is **not** considered to be an accessory synovial structure?

- A) synovial membrane
- B) menisci
- C) bursae
- D) fat pads
- E) tendons

72) The normal movement of the knee joint during walking involves

- A) adduction.
- B) flexion.
- C) extension.
- D) abduction.
- E) both flexion and extension.

73) Which of these is one of the four major types of synarthrotic joints?

- A) suture
- B) synchondrosis
- C) gomphosis
- D) synostosis
- E) All of the answers are correct.

74) A freely movable joint is a(n)

- A) symphysis.
- B) synarthrosis.
- C) amphiarthrosis.
- D) syndesmosis.
- E) diarthrosis.

75) Ankle extension is also called

- A) dorsiflexion.

- B) inversion.
- C) eversion.
- D) protraction.
- E) plantar flexion.

76) All of the following statements are true, **except** one. Identify the exception.

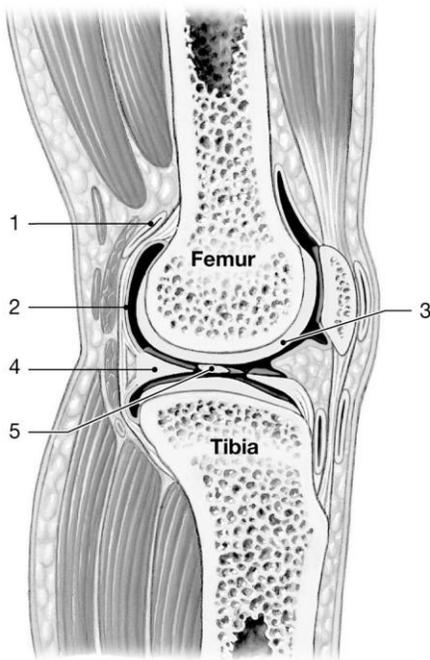
- A) The shapes of the articulating surfaces within the joint help prevent movement in a particular direction and strengthen and stabilize the joint.
- B) The tighter two bones are held together within a joint, the stronger the joint.
- C) The more movement a joint allows, the stronger the joint.
- D) The tension produced by muscle tendons surrounding a joint help stabilize the joint.
- E) The rotator cuff functions to limit the range of movements of the shoulder joint.

77) In a triaxial articulation

- A) only circumduction is possible.
- B) no movement is possible.
- C) movement can occur in only two axes.
- D) movement can occur in only one axis.
- E) movement can occur in all three axes.

78) An epiphyseal line is an example of a

- A) syndesmosis.
- B) synchondrosis.
- C) symphysis.
- D) synostosis.
- E) gomphosis.



**Sagittal section**

**Figure 9-2 A Simplified Sectional View of the Knee Joint**

*Use Figure 9-2 to answer the following questions:*

79) Identify the structure labeled "5."

- A) synovial membrane
- B) intracapsular ligament

- C) serous membrane
- D) periosteum
- E) joint capsule

80) Identify the structure labeled "2."

- A) intracapsular ligament
- B) serous membrane
- C) synovial membrane
- D) joint capsule
- E) periosteum

81) Joints in which the bones are closely fitted are

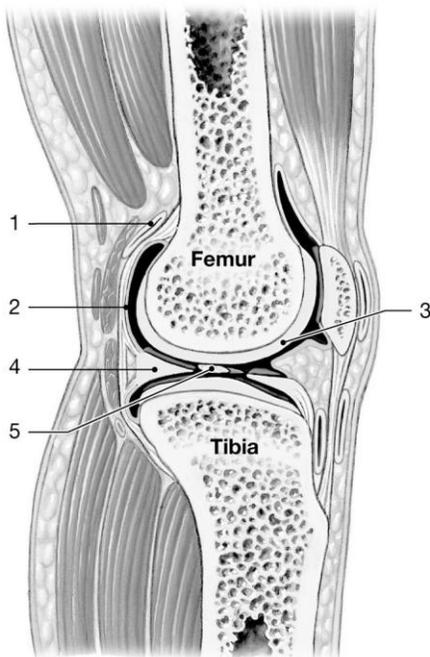
- A) strong joints with restricted movement.
- B) strong and free-moving joints.
- C) weak joints with restricted movement.
- D) joints in the limbs that function for locomotion.
- E) synovial joints.

82) Which of the following movements is a good example of supination?

- A) moving the hand toward the shoulder
- B) opening the mouth
- C) spreading the fingers
- D) turning the hand palm upward
- E) extreme bending of the head backwards

83) A twisting motion of the foot that turns the sole of the foot outward is known as

- A) plantar flexion.
- B) eversion.
- C) inversion.
- D) dorsiflexion.
- E) pronation.



**Sagittal section**

**Figure 9-2 A Simplified Sectional View of the Knee Joint**

Use Figure 9-2 to answer the following questions:

84) Which structure acts as a cushion and consists of fibrous cartilage?

- A) 5
- B) 2
- C) 1
- D) 4
- E) 3

85) The joint that permits the greatest range of mobility of any joint in the body is the \_\_\_\_\_ joint.

- A) wrist
- B) shoulder
- C) hip
- D) elbow
- E) knee

86) The joint between the carpals is a/an \_\_\_\_\_ joint.

- A) gliding
- B) pivot
- C) condylar
- D) hinge
- E) amphiarthrosis

87) Which of the following movements is a good example of depression?

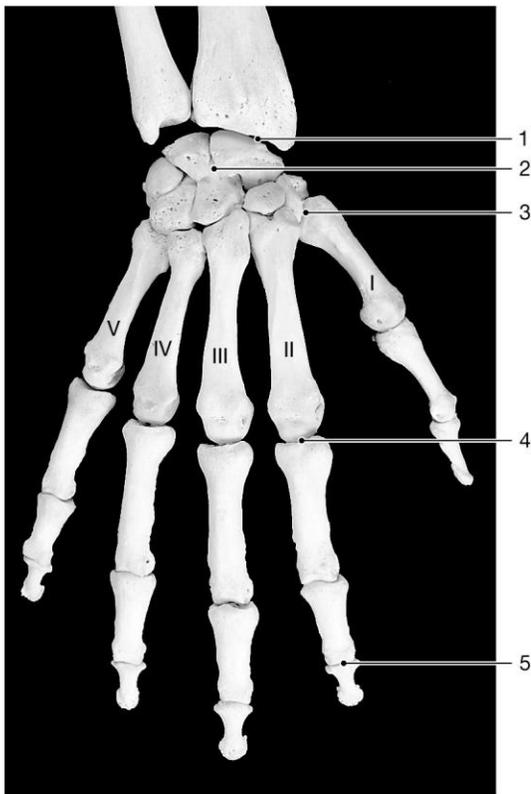
- A) moving the hand toward the shoulder
- B) turning the hand palm upward
- C) opening the mouth
- D) spreading the fingers
- E) extreme bending of the head backwards

88) A herniated intervertebral disc is caused by

- A) loss of annulus fibrosis elasticity.
- B) slippage of the fibrocartilage disc.
- C) protrusion of the nucleus pulposus.
- D) transformation of fibrocartilage to hyaline cartilage.
- E) ossification of the vertebral disc.

89) Degenerative changes in a joint can be the result of all of the following, **except**

- A) mechanical stress.
- B) inflammation.
- C) bursitis.
- D) bacterial infection.
- E) immobilization of the joint.



Posterior view

**Figure 9-1 Bones of the Wrist and Hand**

*Use Figure 9-1 to answer the following questions:*

90) Identify the type of joint at label "2."

- A) saddle
- B) condylar
- C) hinge
- D) gliding
- E) pivot

91) Which ligament connects the clavicle and the acromion?

- A) coracoacromial
- B) glenohumeral
- C) coracoclavicular
- D) acromioclavicular
- E) coracohumeral

92) Joints in which adjacent bones are joined by a strong interosseous ligament are

- A) syndesmoses.
- B) synarthroses.
- C) synchondroses.
- D) symphyses.
- E) diarthroses.

93) The joints that connect the four fingers with the metacarpal bones are

- A) hinge joints.
- B) condylar joints.
- C) pivot joints.
- D) condyloid joints.

E) saddle joints.

94) The movements known as dorsiflexion and plantar flexion involve moving the

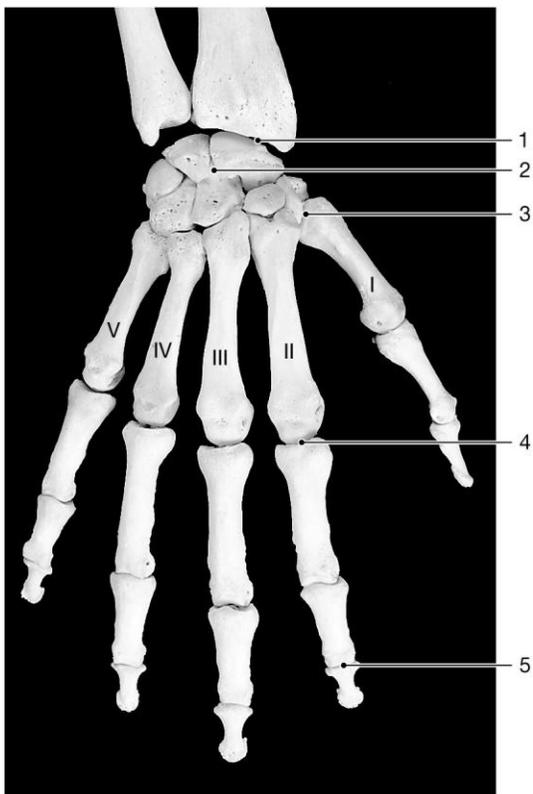
- A) hand.
- B) foot.
- C) hip.
- D) leg.
- E) arm.

95) The ligament that provides support to the front of the knee joint is the \_\_\_\_\_ ligament.

- A) patellar
- B) anterior cruciate
- C) tibial collateral
- D) posterior cruciate
- E) popliteal

96) Which type of joint is found between the carpal bones?

- A) saddle
- B) ball-and-socket
- C) pivot
- D) gliding
- E) hinge



Posterior view

Figure 9-1 Bones of the Wrist and Hand

Use Figure 9-1 to answer the following questions:

97) Identify the type of joint at label "3."

- A) hinge
- B) gliding

- C) condylar
- D) pivot
- E) saddle

98) Which of the following ligaments is **not** associated with the hip joint?

- A) ischiofemoral ligament
- B) anterior cruciate ligament
- C) pubofemoral ligament
- D) iliofemoral ligament
- E) ligamentum teres

99) Which of the following movements is a good example of hyperextension?

- A) turning the hand palm upward
- B) moving the hand toward the shoulder
- C) spreading the fingers
- D) extreme bending of the head backwards
- E) opening the mouth

100) Nodding your head "yes" is an example of

- A) lateral and medial rotation.
- B) circumduction.
- C) protraction and retraction.
- D) flexion and extension.
- E) pronation and supination.

101) When comparing slow muscle fibers to fast muscle fibers, slow fibers

- A) take about three times as long to reach peak tension.
- B) generate much less tension.
- C) are rich in the red protein myoglobin.
- D) have much smaller fiber diameters.
- E) All of the answers are correct.

102) At rest, the tropomyosin molecule is held in place by

- A) actin molecules.
- B) troponin molecules.
- C) myosin molecules.
- D) calcium ions.
- E) ATP molecules.

103) The following is a list of the events that occur during a muscle contraction.

1. Myosin cross-bridges bind to the actin.
2. The free myosin head splits ATP.
3. Calcium ion is released from the sarcoplasmic reticulum.
4. The myosin head pivots toward the center of the sarcomere.
5. Calcium ion binds to troponin.
6. The myosin head binds an ATP molecule and detaches from the actin.

The correct sequence of these events is

- A) 3, 5, 1, 2, 4, 6.
- B) 1, 3, 5, 4, 6, 2.
- C) 3, 5, 1, 4, 6, 2.
- D) 5, 1, 4, 6, 2, 3.
- E) 1, 4, 6, 2, 3, 5.

104) In response to action potentials arriving along the transverse tubules, the sarcoplasmic reticulum releases

- A) acetylcholine.
- B) potassium ions.
- C) calcium ions.
- D) sodium ions.
- E) hydrogen ions.

105) The delicate connective tissue that surrounds the skeletal muscle fibers and ties adjacent muscle fibers together is the

- A) endomysium.
- B) superficial fascia.
- C) periosteum.
- D) perimysium.
- E) epimysium.

106) A muscle producing tension that peaks and falls at intermediate stimulus rates is said to be in

- A) complete tetanus.
- B) wave summation.
- C) recruitment.
- D) incomplete tetanus.
- E) treppe.

107) Creatine phosphate

- A) is produced by the process of anaerobic respiration.
- B) is only formed during strenuous exercise.
- C) cannot transfer its phosphate group to ADP.
- D) acts as an energy reserve in muscle tissue.
- E) can replace ATP in binding to myosin molecules during contraction.

108) A fascicle is

- A) a group of muscle fibers and motor neurons.
- B) a collection of myofibrils in a muscle fiber.
- C) the belly of a muscle.
- D) a group of muscle fibers that are all part of the same motor unit.
- E) a group of muscle fibers that are encased in the perimysium.

109) Triggering of the muscle action potential occurs after

- A) calcium ion binds to channels on the end plate.
- B) the nerve action potential jumps across the neuromuscular junction.
- C) acetylcholine binds to chemically-gated channels in the end plate membrane.
- D) acetylcholinesterase binds to receptors on the end plate.
- E) Any of the above can produce an action potential in the muscle cell.

110) Fast fibers

- A) have low resistance to fatigue and have quick twitches.
- B) rely on aerobic metabolism.
- C) have twitches with a very brief contraction phase.
- D) have many mitochondria.
- E) have low resistance to fatigue.

111) The region of the sarcomere that always contains thin filaments is the

- A) I band.

- B) Z line.
- C) M line.
- D) A band.
- E) H band.

112) In which of the following would the motor units have the fewest muscle fibers?

- A) postural muscles of the back
- B) calf muscles
- C) muscles of the neck
- D) thigh muscles
- E) muscles that control the eyes

113) Receptors for acetylcholine are located on the

- A) sarcomere.
- B) synaptic knob.
- C) transverse tubule.
- D) synaptic cleft.
- E) motor end plate.

114) When a skeletal muscle fiber contracts,

- A) the H bands and I bands get smaller.
- B) the Z lines get closer together.
- C) the width of the A band remains constant.
- D) the zones of overlap get larger.
- E) All of the answers are correct.

115) The most important factor in decreasing the intracellular concentration of calcium ion after contraction is

- A) active transport of calcium into the synaptic cleft.
- B) diffusion of calcium into the sarcoplasmic reticulum.
- C) active transport of calcium into the sarcoplasmic reticulum.
- D) diffusion of calcium out of the cell.
- E) active transport of calcium across the sarcolemma.

116) Interactions between actin and myosin filaments of the sarcomere are responsible for

- A) muscle fatigue.
- B) the striped appearance of skeletal muscle.
- C) muscle contraction.
- D) muscle relaxation.
- E) the conduction of neural stimulation to the muscle fiber.

117) Physical evidence that supports the sliding filament theory of muscle contraction includes

- A) decreased width of the H band during contraction.
- B) constant distance between Z lines during contraction.
- C) the I band + H band distance is constant during contraction.
- D) increased width of the I band during contraction.
- E) decreased width of the A band during contraction.

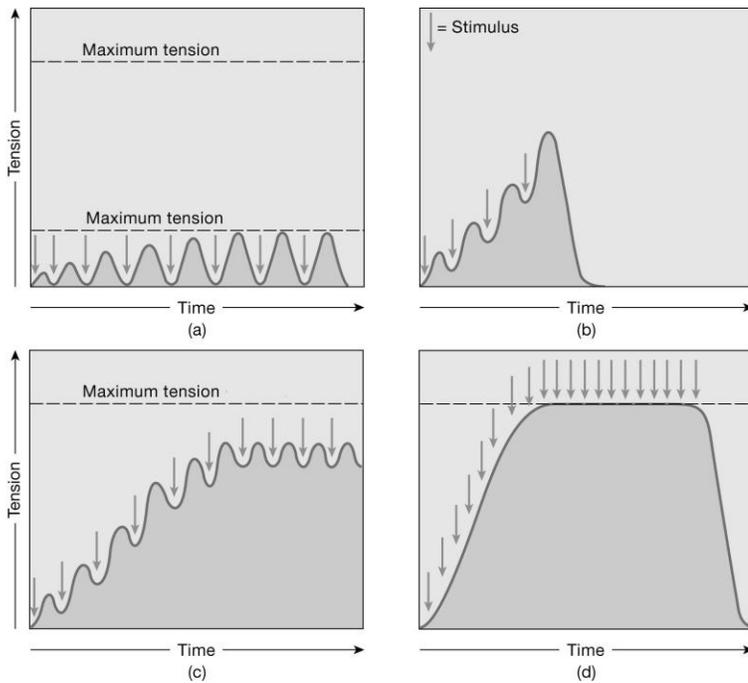
118) When contraction occurs,

- A) the width of the A band remains constant.
- B) the I bands get smaller.
- C) the Z lines move closer together.
- D) the H bands get smaller.

E) All of the answers are correct.

119) Fast muscle fibers can adapt to aerobic metabolism by generating more mitochondria in response to

- A) increased levels of testosterone.
- B) high amounts of oxygen.
- C) prolonged periods of inactivity.
- D) sustained low levels of muscle activity.
- E) repeated, exhaustive stimulation.



**Figure 10-2 Muscle Contractions**

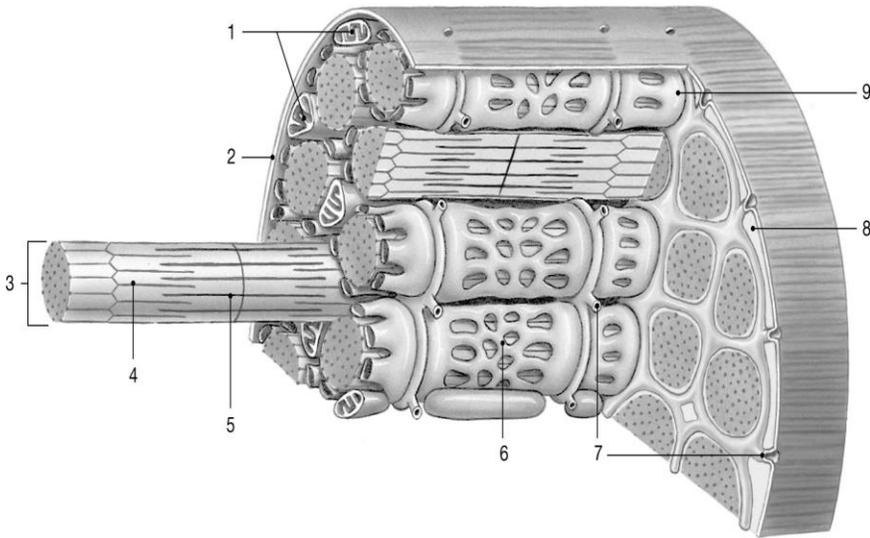
*Use Figure 10-2 to answer the following questions:*

120) To produce a contraction similar to the one in graph (b), the muscle

- A) is excited by a stimulus of increasing intensity.
- B) gradually warms up.
- C) must be stimulated to the point of fatigue.
- D) must be stimulated again before it has relaxed from the previous stimulation.
- E) is caused to produce isolated twitches.

121) What is the contraction in graph (a) called?

- A) complete tetanus
- B) treppe
- C) wave summation
- D) twitch
- E) incomplete tetanus



**Figure 10-1 Skeletal Muscle Fiber**

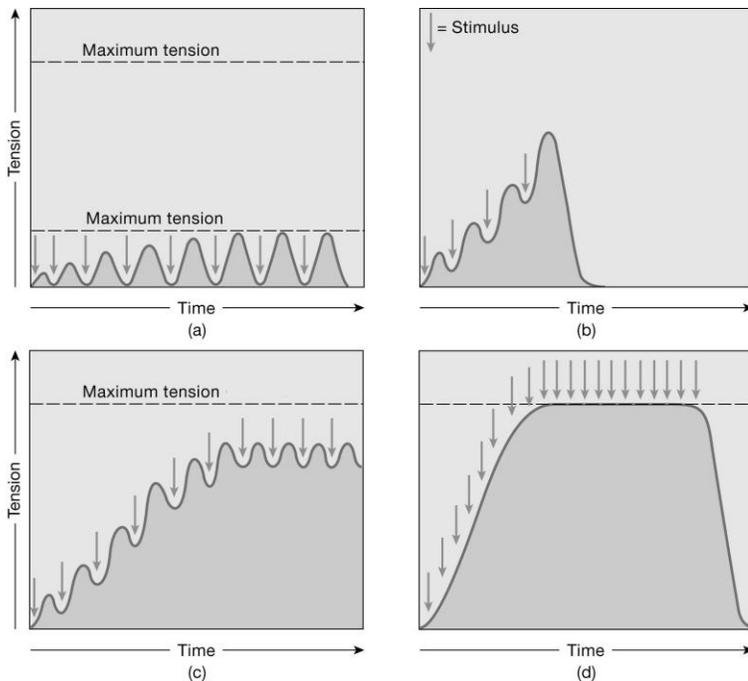
Use Figure 10-1 to answer the following questions:

122) Where are the myosin molecules located?

- A) 6
- B) 8
- C) 5
- D) 7
- E) 4

123) At peak levels of muscle exertion the mitochondria can supply

- A) only about one-third of the energy required by the muscle.
- B) more than half of the energy required by the muscle.
- C) all of the energy required by the muscle.
- D) 80 percent of the energy required by the muscle.
- E) only about 10 percent of the energy required by the muscle.



**Figure 10-2 Muscle Contractions**

Use Figure 10-2 to answer the following questions:

124) Why is there partial relaxation in graph (c)?

- A) ATP reserves are cycling.
- B) The muscle is starting to fatigue.
- C) Nerve stimulation frequency is below maximum.
- D) Calcium ion release is slow.
- E) Stimulation intensity is fluctuating.

125) Which of the following best describes the term *Z line*?

- A) thin filaments are anchored here
- B) largely made of myosin molecules
- C) repeating unit of striated myofibrils
- D) storage site for calcium ions
- E) protein that accounts for elasticity of resting muscle

126) Synaptic vesicles contain neurotransmitters that are released by \_\_\_\_\_ when the action potential arrives.

- A) endocytosis
- B) apoptosis
- C) hydrolysis
- D) sodium
- E) exocytosis

127) The area in the center of the A band that contains no thin filaments is the

- A) M line.
- B) H band.
- C) I band.
- D) zone of overlap.
- E) Z line.

128) During the recovery period following exercise, all of the following are true, **except**

- A) muscle fibers are unable to contract.
- B) lactic acid is removed from muscle cells.
- C) the muscle actively produces ATP.
- D) oxygen is consumed at above the resting rate.
- E) heat is generated.

129) Which of the following become connected by myosin cross-bridges during muscle contraction?

- A) thin filaments and t-tubules
- B) thin filaments and thick filaments
- C) z disks and actin filaments
- D) thick filaments and titin filaments
- E) thick filaments and t-tubules

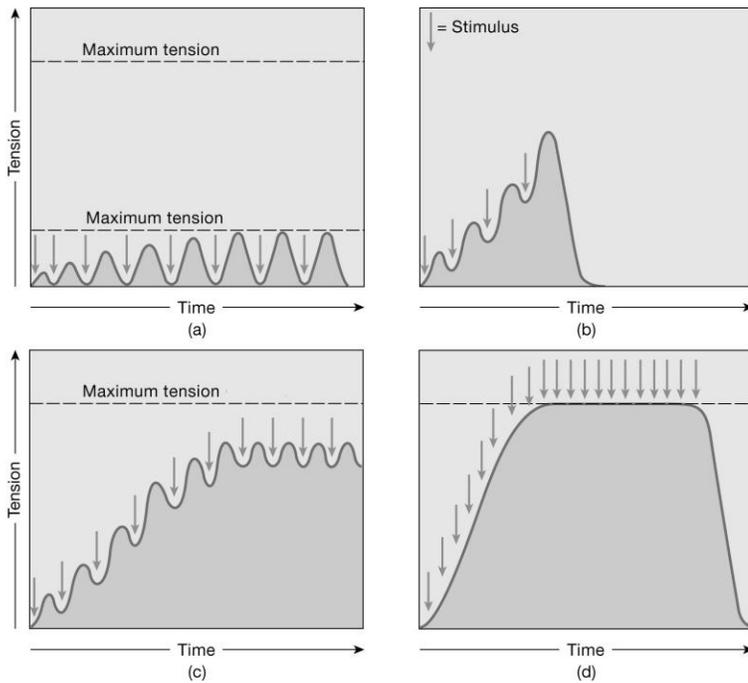
130) The bundle of collagen fibers at the end of a skeletal muscle that attaches the muscle to bone is called a(n)

- A) epimysium.
- B) tendon.
- C) ligament.
- D) fascicle.
- E) myofibril.

131) Which of the following is **not** a function of smooth muscle tissue?

- A) altering the diameter of the respiratory passageways

- B) moving food materials along the digestive tract
- C) forcing blood from the heart into the major arteries
- D) forcing urine out of the urinary tract
- E) elevating hairs on the arm



**Figure 10-2 Muscle Contractions**

Use Figure 10-2 to answer the following questions:

132) What is thought to happen in a muscle during the response shown in graph (a)?

- A) It is fatigued and must make repeated efforts to twitch normally.
- B) It is producing more ATP as tension increases.
- C) It is aged and has lost contractile proteins.
- D) There is a gradual increase in the concentration of calcium ions in the sarcoplasm.
- E) It is getting stronger with exercise.

133) During the Cori cycle, in the liver

- A) lactic acid is produced from pyruvic acid.
- B) lactic acid is shuffled to muscle cells.
- C) lactic acid is produced from glucose.
- D) glucose is released from glycogen.
- E) glucose is produced from lactic acid.

134) Which type of muscle fibers are best adapted for prolonged contraction such as standing all day?

- A) uninucleated fibers
- B) slow fibers
- C) striated fibers
- D) fast fibers
- E) intermediate fibers

135) The muscle weakness of myasthenia gravis results from

- A) insufficient acetylcholine release from presynaptic vesicles.
- B) the motor neuron action potential being too small to shock the muscle fibers.
- C) loss of acetylcholine receptors in the end-plate membrane.
- D) excessive acetylcholinesterase that destroys the neurotransmitter.

E) inability of the muscle fiber to produce ATP.

136) When a muscle is stimulated repeatedly at a high rate, the amount of tension gradually increases to a steady maximum tension. This is called

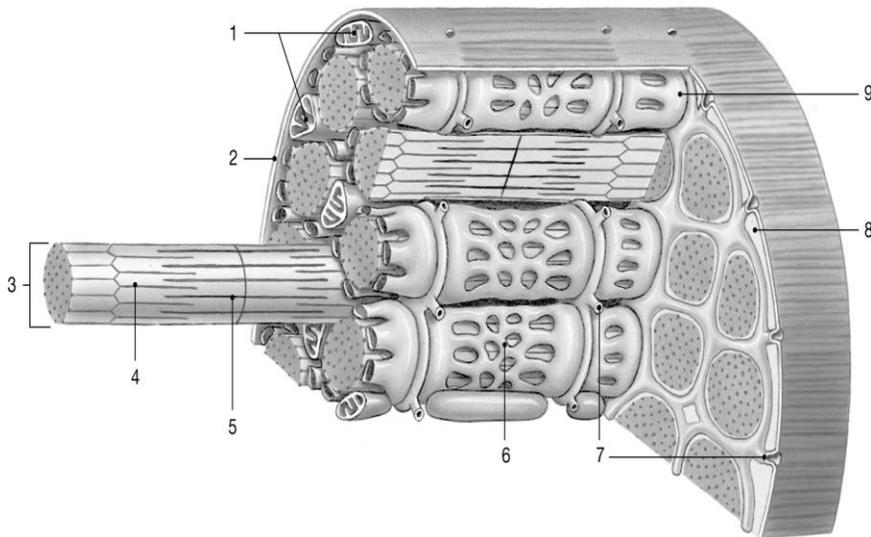
- A) complete tetanus.
- B) incomplete tetanus.
- C) recruitment.
- D) wave summation.
- E) a twitch.

137) How would the loss of acetylcholinesterase from the motor end plate affect skeletal muscle?

- A) It would cause flaccid paralysis (muscles are relaxed and unable to contract).
- B) It would produce muscle weakness.
- C) It would have little effect on skeletal muscles.
- D) It would make the muscles less excitable.
- E) It would cause spastic paralysis (muscles are contracted and unable to relax).

138) Because skeletal muscle contractions demand large quantities of ATP, skeletal muscles have

- A) a rich blood supply and few mitochondria
- B) a rich nerve supply.
- C) many mitochondria and a rich blood supply.
- D) abundant mitochondria and a poor blood supply.
- E) adipose tissue between fibers to supply nutrients for ATP production.



**Figure 10-1 Skeletal Muscle Fiber**

*Use Figure 10-1 to answer the following questions:*

139) Where is ATP is consumed?

- A) 3 and 6
- B) 1
- C) 2
- D) 3
- E) 6

140) Aerobic metabolism normally provides \_\_\_\_\_ percent of the ATP demands of a resting muscle cell.

- A) 95
- B) 100

- C) 50
- D) 70
- E) 25

141) During anaerobic glycolysis

- A) carbohydrate is metabolized.
- B) oxygen is not consumed.
- C) pyruvic acid is produced.
- D) ATP is produced.
- E) All of the answers are correct.

142) If a second stimulus arrives before the relaxation phase has ended, a second, more powerful contraction occurs. This is called

- A) incomplete tetanus.
- B) wave summation.
- C) complete tetanus.
- D) treppe.
- E) recruitment.

143) When acetylcholine binds to receptors at the motor end plate, the end plate membrane becomes

- A) less permeable to sodium ions.
- B) less permeable to potassium ions.
- C) more permeable to calcium ions.
- D) more permeable to sodium ions.
- E) repolarized.

144) Which of the following statements is **false**?

- A) Cardiac muscle contractions cannot be summated.
- B) Cardiocytes are interconnected through intercalated discs.
- C) Skeletal muscle stimulation is neural.
- D) Cardiac muscle stimulation is neural.
- E) Skeletal muscle contractions may be summated.

145) Each thin filament consists of

- A) two actin protein strands coiled helically around each other.
- B) a rod-shaped structure with "heads" projecting from each end.
- C) six molecules coiled into a helical structure.
- D) a double strand of myosin molecules.
- E) chains of myosin molecules.

146) Each skeletal muscle fiber is controlled by a motor neuron at a single

- A) synaptic cleft.
- B) neuromuscular junction.
- C) transverse tubule.
- D) sarcomere.
- E) synaptic knob.

147) Each skeletal muscle fiber contains \_\_\_\_\_ myofibrils.

- A) 50 to 100
- B) 100 to 150
- C) 150 to 200
- D) 200 to 500

E) hundreds to thousands

148) During the recovery period the body's need for oxygen is increased because

- A) the individual is panting.
- B) the liver requires more oxygen to produce lactic acid.
- C) additional oxygen is required to restore energy reserves consumed during exercise.
- D) muscle cells are producing energy anaerobically.
- E) the muscles are not producing ATP.

149) The contraction of a muscle exerts a pull on a bone because

- A) muscle fibers directly attach to the periosteum of bone.
- B) muscles are attached to bones by tendons.
- C) muscles elongate upon contraction.
- D) muscles are attached to bones by ligaments.
- E) muscles are attached to bones by bursae.

150) The rapid rise and fall in force produced by a muscle fiber after a single action potential is

- A) an unfused tetanus.
- B) an end plate potential.
- C) a twitch.
- D) a tetanus.
- E) a muscle action potential.

- 1) C
- 2) B
- 3) A
- 4) A
- 5) A
- 6) D
- 7) E
- 8) D
- 9) C
- 10) D
- 11) A
- 12) C
- 13) D
- 14) C
- 15) B
- 16) E
- 17) E
- 18) E
- 19) B
- 20) B
- 21) C
- 22) E
- 23) C
- 24) B
- 25) D
- 26) D
- 27) C
- 28) E
- 29) D
- 30) A
- 31) C
- 32) A
- 33) A
- 34) D
- 35) E
- 36) E
- 37) C
- 38) B
- 39) A
- 40) A
- 41) D
- 42) E
- 43) C
- 44) B
- 45) A
- 46) A
- 47) C
- 48) D
- 49) E
- 50) E
- 51) E
- 52) B

- 53) A
- 54) B
- 55) C
- 56) C
- 57) E
- 58) C
- 59) B
- 60) E
- 61) D
- 62) A
- 63) E
- 64) E
- 65) C
- 66) E
- 67) E
- 68) B
- 69) E
- 70) D
- 71) A
- 72) E
- 73) E
- 74) E
- 75) E
- 76) C
- 77) E
- 78) D
- 79) B
- 80) C
- 81) A
- 82) D
- 83) B
- 84) D
- 85) B
- 86) A
- 87) C
- 88) C
- 89) C
- 90) D
- 91) D
- 92) A
- 93) B
- 94) B
- 95) A
- 96) D
- 97) E
- 98) B
- 99) D
- 100) D
- 101) E
- 102) B
- 103) C
- 104) C

105) A  
106) D  
107) D  
108) E  
109) C  
110) A  
111) A  
112) E  
113) E  
114) E  
115) C  
116) C  
117) A  
118) E  
119) E  
120) D  
121) B  
122) C  
123) A  
124) C  
125) A  
126) E  
127) B  
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131) C  
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142) B  
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146) B  
147) E  
148) C  
149) B  
150) C