

9 EXERCISE

REVIEW SHEET

The Axial Skeleton



Instructors may assign a portion of the Review Sheet questions using **Mastering A&P™**

Name Zhuoying Tan Lab Time/Date _____

The Skull

1. First, match the bone names in column B with the descriptions in column A (the items in column B may be used more than once). Then, circle the bones in column B that are cranial bones.

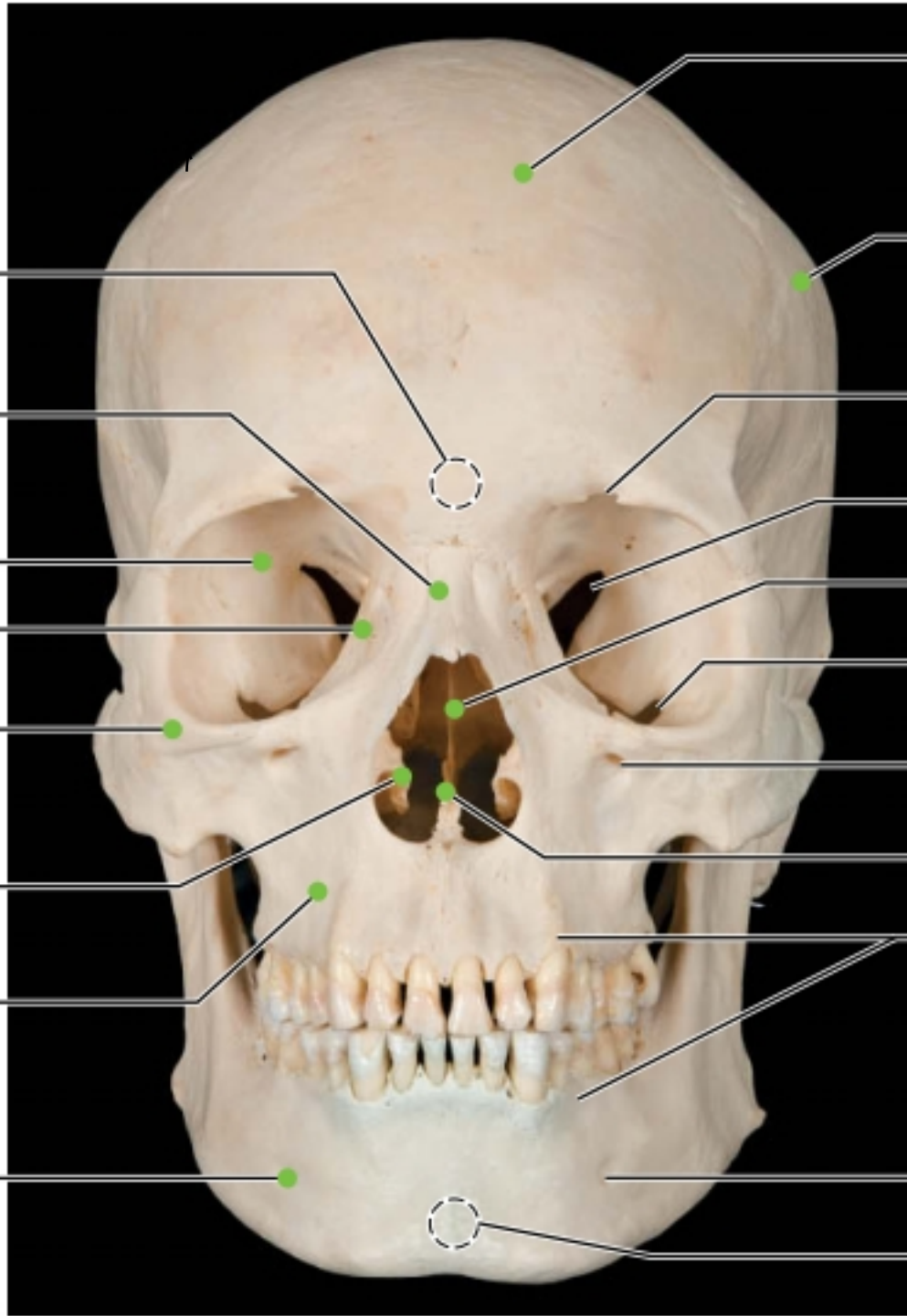
Column A

- | | |
|------------------------------|--|
| <u>Frontal</u> | 1. forms the anterior cranium |
| <u>Zygomatic</u> | 2. cheekbone |
| <u>Nasal</u> | 3. bridge of nose |
| <u>Palatine</u> | 4. posterior bones of the hard palate |
| <u>Parietal</u> | 5. much of the lateral and superior cranium |
| <u>Sphenoid</u> | 6. single, irregular, bat-shaped bone forming part of the cranial base |
| <u>Lacrimal</u> | 7. tiny bones bearing tear ducts |
| <u>Maxilla</u> | 8. anterior part of hard palate |
| <u>Ethmoid</u> | 9. superior and middle nasal conchae form from its projections |
| <u>Temporals</u> | 10. site of mastoid process |
| <u>Occipital</u> | 11. has condyles that articulate with the atlas |
| <u>Hyoid</u> | 12. small U-shaped bone in neck, where many tongue muscles attach |
| <u>Temporals</u> | 13. organ of hearing found here |
| <u>Ethmoid, Vomer</u> | 14. two bones that form the nasal septum |
| <u>Inferior Nasal Concha</u> | 15. forms the most inferior turbinate |

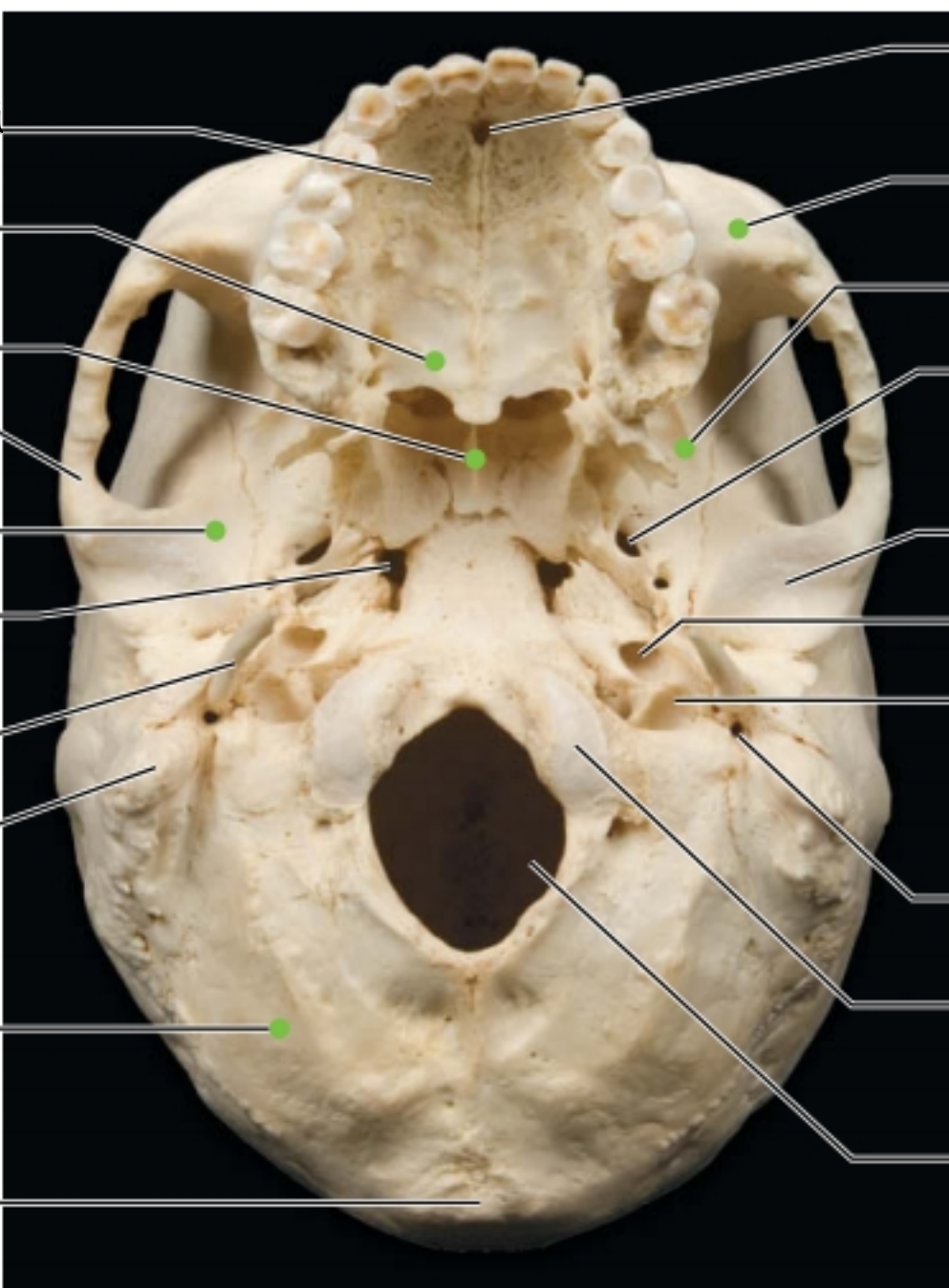
Column B

- a. **ethmoid**
- b. **frontal**
- c. hyoid
- d. inferior nasal concha
- e. lacrimal
- f. mandible
- g. maxilla
- h. nasal
- i. **occipital**
- j. palatine
- k. **parietal**
- l. **sphenoid**
- m. **temporal**
- n. vomer
- o. zygomatic

2. Using choices from the numbered key to the right, identify all bones and bone markings provided with various leader lines in the two following photographs. A colored dot at the end of a leader line indicates a bone. Leader lines without a colored dot indicate bone markings. Note that vomer, sphenoid bone, and zygomatic bone will each be labeled twice.



- Key:
1. alveolar processes
 2. carotid canal
 3. ethmoid bone (perpendicular plate)
 4. external occipital protuberance
 5. foramen lacerum
 6. foramen magnum
 7. foramen ovale
 8. frontal bone
 9. glabella
 10. incisive fossa
 11. inferior nasal concha
 12. inferior orbital fissure
 13. infraorbital foramen
 14. jugular foramen
 15. lacrimal bone
 16. mandible
 17. mandibular fossa
 18. mandibular symphysis
 19. mastoid process
 20. maxilla
 21. mental foramen
 22. nasal bone
 23. occipital bone
 24. occipital condyle
 25. palatine bone
 26. palatine process of maxilla
 27. parietal bone
 28. sphenoid bone
 29. styloid process
 30. stylomastoid foramen
 31. superior orbital fissure
 32. supraorbital foramen
 33. temporal bone
 34. vomer
 35. zygomatic bone
 36. zygomatic process



31. superior orbital fissure
32. supraorbital foramen
33. temporal bone
34. vomer
35. zygomatic bone
36. zygomatic process

3. Define suture. The parietal bones connect with each other and where parietal bone connect with cranial bone.
4. With one exception, the skull bones are joined by sutures. Name the exception.

The parietal bone and the temporal bone.

5. What bones are connected by the lambdoid suture?

Parietal bones and occipital bone posteriorly

What bones are connected by the squamous suture?

parietal bones and temporal bone

6. Name the eight bones of the cranium. (Remember to include left and right.)

Frontal Temporal (Left) Sphenoid Temporal (Right)
parietal Occipital Ethmoid parietal (Right)

7. List the bones that have sinuses, and give two possible functions of the sinuses.

The frontal, sphenoid, ethmoid, and paired maxillary bones. The functions of the sinus is produce mucus to moisture inside of the nose. The sinus also help improves our voices.

8. What is the bony orbit? Cavity that hold up the eye ball

What bones contribute to the formation of the orbit? Sphenoid, Frontal, Zygomatic, Ethmoid, Lacrimal
 Maxilla, and palatine

9. Why can the sphenoid bone be called the keystone bone of the cranium? Because it articulate with all other
 Cranial bones

The Vertebral Column

10. The distinguishing characteristics of the vertebrae composing the vertebral column are noted below. Correctly identify each described structure by choosing a response from the key.

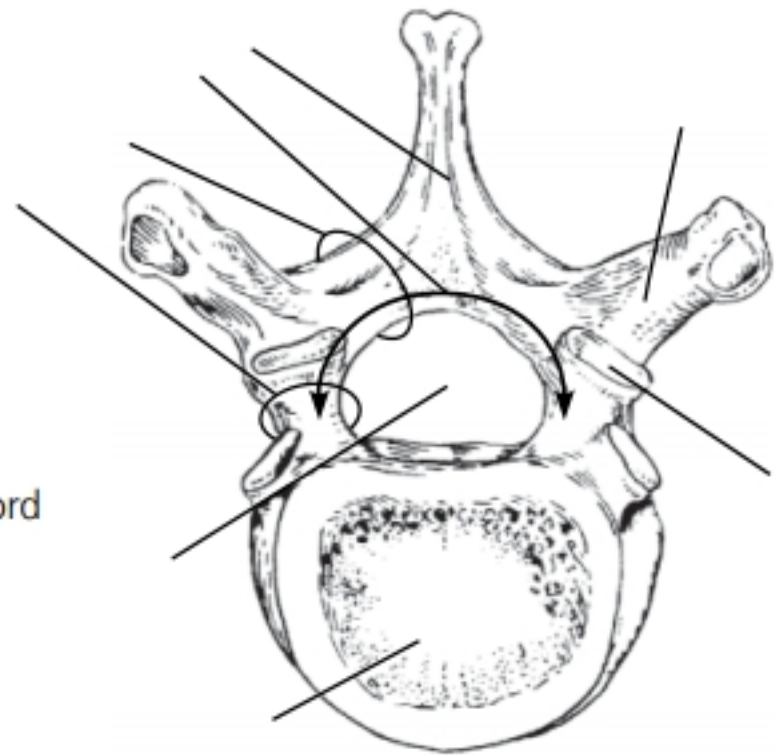
- | | | |
|------------------------------|-------------------------------|----------------------|
| Key: a. atlas | d. coccyx | f. sacrum |
| b. axis | e. lumbar vertebra | g. thoracic vertebra |
| c. cervical vertebra—typical | | |

- | | | |
|--------------------------|----|---|
| <u>Cervical Vertebra</u> | 1. | vertebra type containing foramina in the transverse processes, through which the vertebral arteries ascend to reach the brain |
| <u>Axis</u> | 2. | dens here provides a pivot for rotation of the first cervical vertebra (C ₁) |
| <u>Thoracic Vertebra</u> | 3. | transverse processes faceted for articulation with ribs; spinous process pointing sharply downward |
| <u>Sacrum</u> | 4. | composite bone; articulates with the hip bone laterally |
| <u>Lumbar Vertebra</u> | 5. | massive vertebra; weight-sustaining |
| <u>Coccyx</u> | 6. | "tail bone" fused vertebrae |
| <u>Atlas</u> | 7. | supports the head; allows a rocking motion in conjunction with the occipital condyles |

11. Using the key, correctly identify the vertebral parts/areas described below. (More than one choice may apply in some cases.) Also use the key letters to correctly identify the vertebral areas in the diagram.

- | | | |
|----------------------------|-----------------------------|-----------------------|
| Key: a. body | d. pedicle | g. transverse process |
| b. intervertebral foramina | e. spinous process | h. vertebral arch |
| c. lamina | f. superior articular facet | i. vertebral foramen |

- | | | |
|--|----|---|
| <u>Vertebra Foramen</u> | 1. | cavity enclosing the spinal cord |
| <u>Body</u> | 2. | weight-bearing portion of the vertebra |
| <u>Spinous process, Transverse Process</u> | 3. | provide levers against which muscles pull |
| <u>Body, Transverse Process</u> | 4. | provide an articulation point for the ribs |
| <u>Intervertebral Foramina</u> | 5. | openings providing for exit of spinal nerves |
| <u>Body, Vertebral Arch</u> | 6. | structures that form an enclosure for the spinal cord |
| <u>Lamina, Pedicle</u> | 7. | structures that form the vertebral arch |



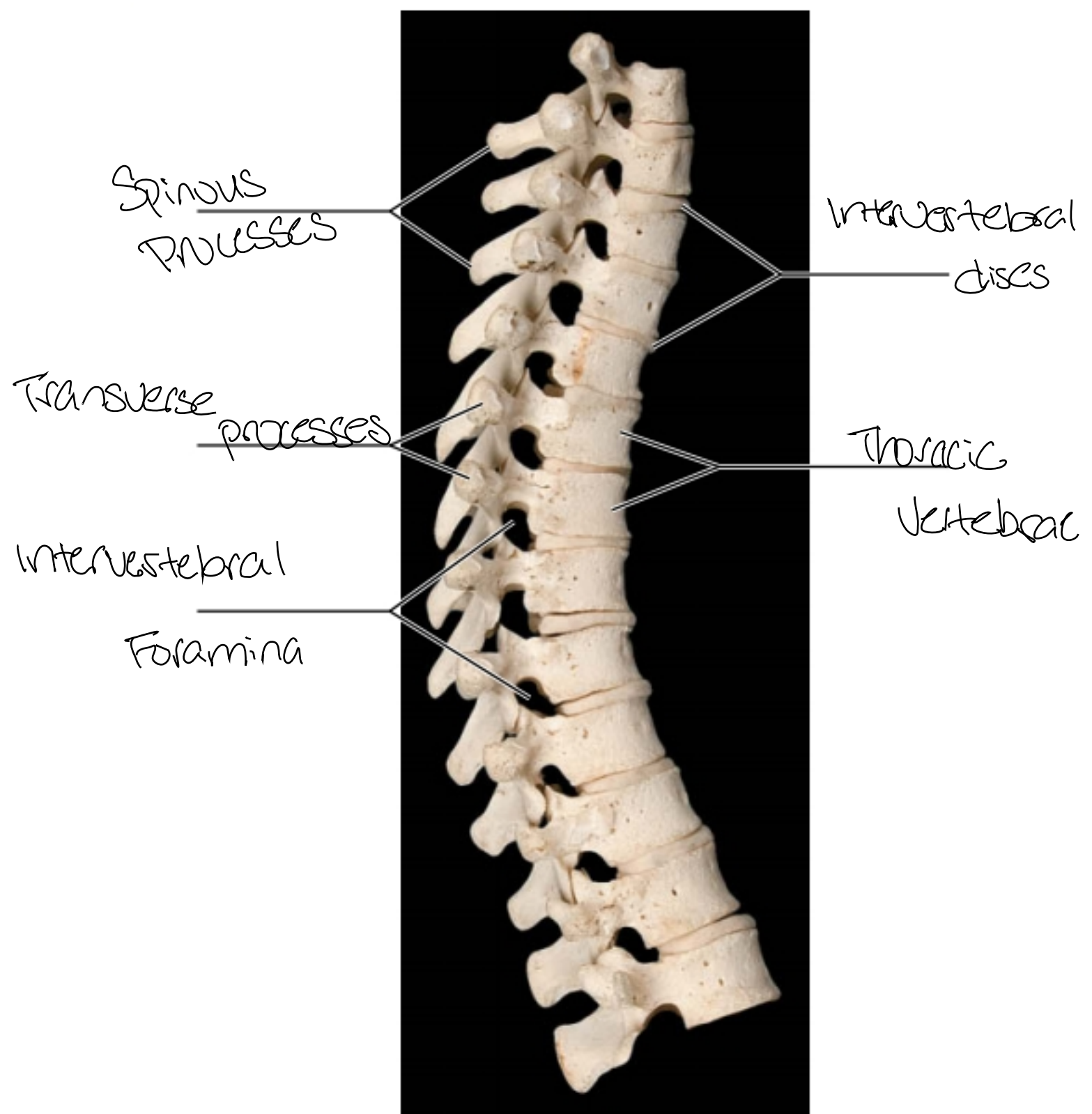
12. Describe how a spinal nerve exits from the vertebral column. Exit through Ventral root

13. Name two factors/structures that permit flexibility of the vertebral column.
Curvatures and Intervertebral discs

14. What kind of tissue makes up the intervertebral discs? Fibrocartilage

15. What is a herniated disc? Refer to a problem with a rubbery disc between the spinal bones.
 What problems might it cause? Causes in pain, numbness, or weakness in arm or leg.
-
16. Which two spinal curvatures are obvious at birth? Thoracic Curvatures and Sacral Curvatures
 Under what conditions do the secondary curvatures develop? When the children learn how to sit up straight, stand, and walk.
-
17. Use the key to label the structures on the thoracic region of the vertebral column.

- Key:
- a. intervertebral discs
 - b. intervertebral foramina
 - c. spinous processes
 - d. thoracic vertebrae
 - e. transverse processes



The Thoracic Cage

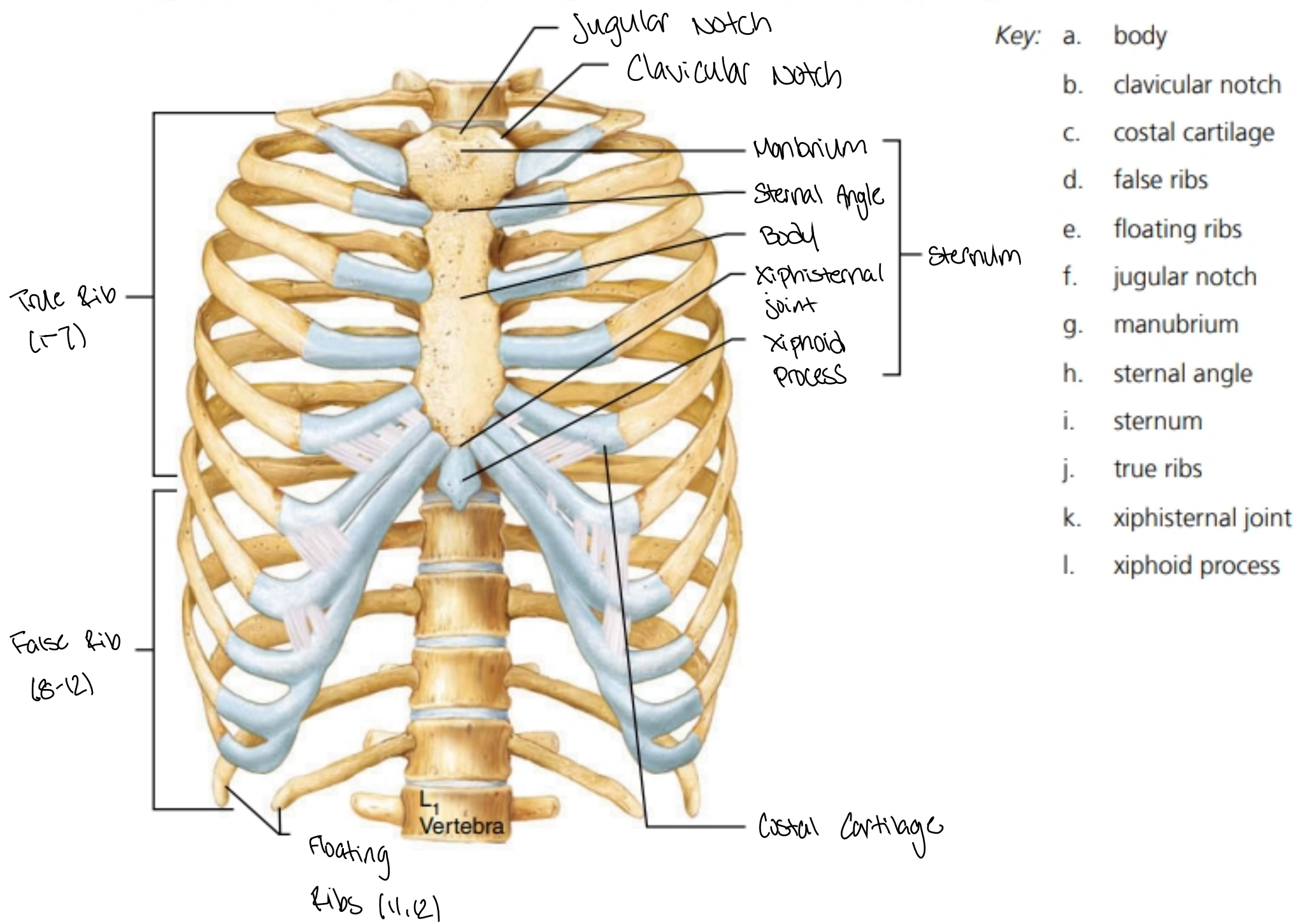
18. The major bony components of the thorax (excluding the vertebral column) are the Sternum and the ribs

19. Differentiate between a true rib and a false rib. True rib is the vertebrosteral, that attach directly to the sternum by their own costal cartilages. False rib is attach indirectly to the sternum.

Is a floating rib a true or a false rib? False Rib

20. What is the general shape of the thoracic cage? Cone shape and cage like

21. Using the terms in the key, identify the regions and landmarks of the thoracic cage.



The Fetal Skull

22. Are the same skull bones seen in the adult also found in the fetal skull? Yes
23. How does the size of the fetal face compare to its cranium? The fetal face are shorter and Cranium are larger.
 How does this compare to the adult skull? The facial bone are larger and the Cranium bone is smaller.
24. What are the outward conical projections on some of the fetal cranial bones? Ossification centers
25. What is a fontanelle? Space between the bones of the skull in a fetus
 What is its fate? Area that form suture
 What is the function of the fontanelles in the fetal skull? Allow brain to develop and allow bone to compress during birth.
26. **+** Craniosynostosis is a condition in which one or more of the fontanelles is replaced by bone prematurely. Discuss the ramifications of this early closure.
Head deformation will occur that might be severe permanently. Which also increase pressure in the brain that cause seizures.
27. **+** As we age, we often become shorter. Explain why this might occur. Because osteoporosis causes the spinal column to be shorter.
28. **+** The xiphoid process is often missing from the sternum in bone collections. Hypothesize why it might be missing. The xiphoid process can separate from the sternum during chest compressions.

The Definition Assignment

1. Vomer: Thin, blade-shaped bone from the interior of the nasal septum.
2. Sphenoid: Is the keystone and connects with all other cranial bones.
3. Styloid process: Attachment of the ligaments and the neck muscle.
4. Mandibular fossa: Located in the interior of zygomatic processes. It receives condylar process of the mandible and forms temporomandibular joint.
5. Condylar fossa: Connect with the mandibular fossa temporal bones.
6. Lambdoid suture: Located where the parietal bones meet the occipital bone posteriorly.
7. Palatine Bone: Forms posterior hard plates, small part of nasal cavity and part of the orbit.
8. Stylomastoid foramen: Tiny opening between the mastoid and styloid where cranial nerve leaves the cranium.
9. Occipital condyle: Round projection lateral to the foramen magnum that connects with the atlas.
10. Foramen magnum: Large opening at the base bone. Allows spine cord join the brain stem.

10

EXERCISE

REVIEW SHEET

The Appendicular Skeleton



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Name Zhuoqing Tan Lab Time/Date _____

Bones of the Pectoral Girdle and Upper Limb

1. Fill in the blank to complete the statements below:

a. The bones that form the pectoral girdle are the Clavicle and Scapula.

b. The upper limb is formed by the arm bone, the humerus, and the two bones of the forearm, the radius and ulna.

c. The Carpals are the wrist bones. List the proximal row of wrist bones from lateral to medial: _____
Scaphoid, lunate, triquetrum, pisiform.

List the distal row of wrist bones from lateral to medial: trapezium, trapezoid, Capitate, hamate

d. The metacarpals form the palm of the hand, and the heads of these bones form the knuckles.

e. A single finger bone is called a phalanx. Each hand has 5 finger bones, called phalanges.

2. Match the bone markings in column B with the descriptions in column A.

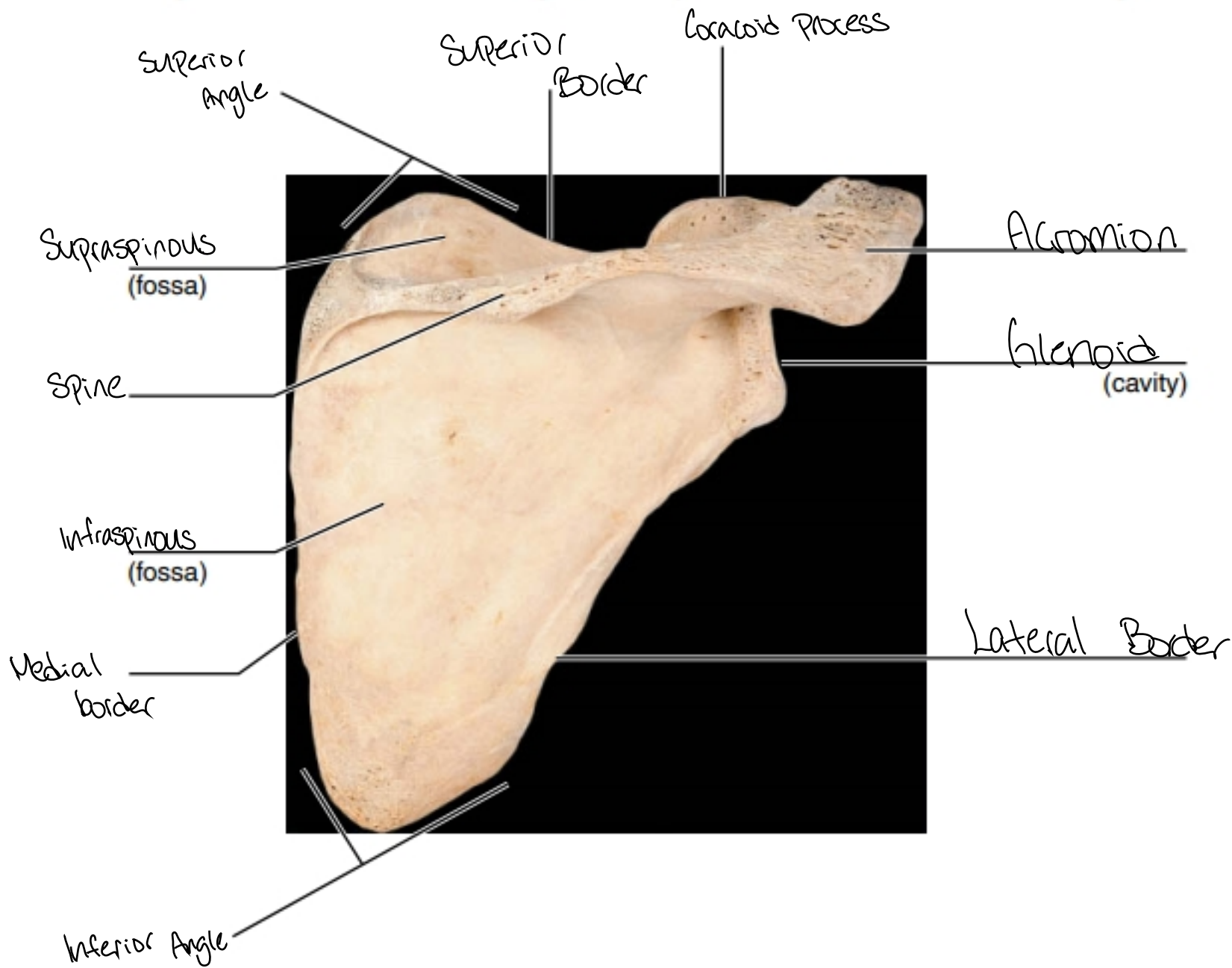
Column A

- Glenoid Cavity 1. depression in the scapula that articulates with the humerus
- Ulnar notch 2. surface on the radius that receives the head of the ulna
- Capitulum 3. lateral rounded knob on the distal humerus
- Olecranon fossa 4. posterior depression on the distal humerus
- Deltoid tuberosity 5. a roughened area on the lateral humerus: deltoid attachment site
- Coracoid process 6. hooklike process; biceps brachii attachment site
- Radial notch 7. surface on the ulna that receives the head of the radius
- Medial Epicondyle 8. medial condyle of the humerus that articulates with the ulna
- Acromion 9. lateral end of the spine of the scapula; clavicle articulation site
- Trochlea 10. small bump on the humerus, often called the "funny bone"
- Coronoid fossa 11. anterior depression, superior to the trochlea, that receives part of the ulna when bending at the elbow

Column B

- a. acromion
- b. capitulum
- c. coracoid process
- d. coronoid fossa
- e. deltoid tuberosity
- f. glenoid cavity
- g. medial epicondyle
- h. olecranon fossa
- i. radial notch
- j. trochlea
- k. ulnar notch

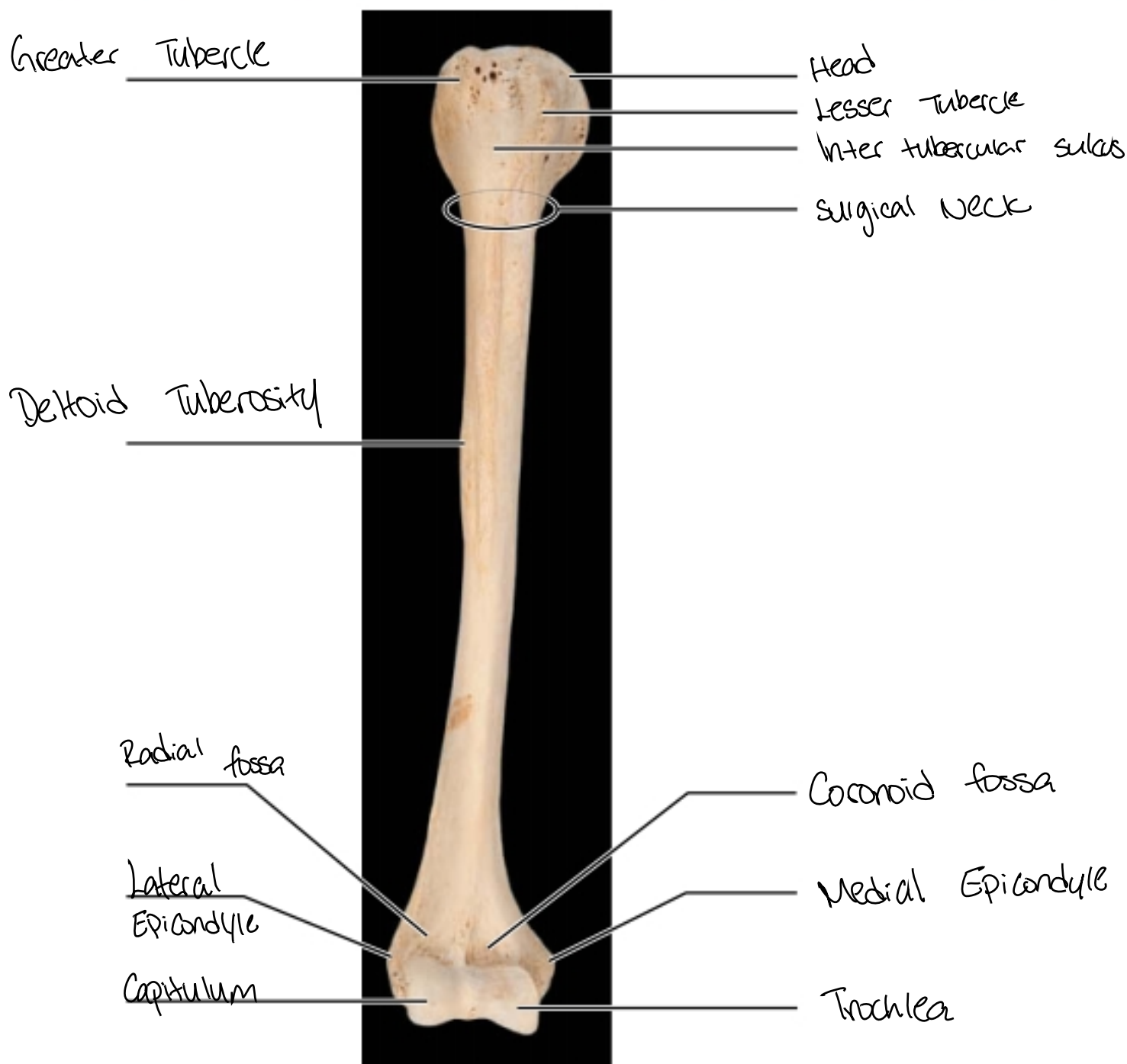
3. Using items from the list at the right, identify the anatomical landmarks and regions of the scapula.



Key:

- a. ~~acromion~~
- b. ~~coracoid process~~
- c. ~~glenoid cavity~~
- d. ~~inferior angle~~
- e. ~~infraspinous fossa~~
- f. ~~lateral border~~
- g. ~~medial border~~
- h. ~~spine~~
- i. ~~superior angle~~
- j. ~~superior border~~
- k. ~~supraspinous fossa~~

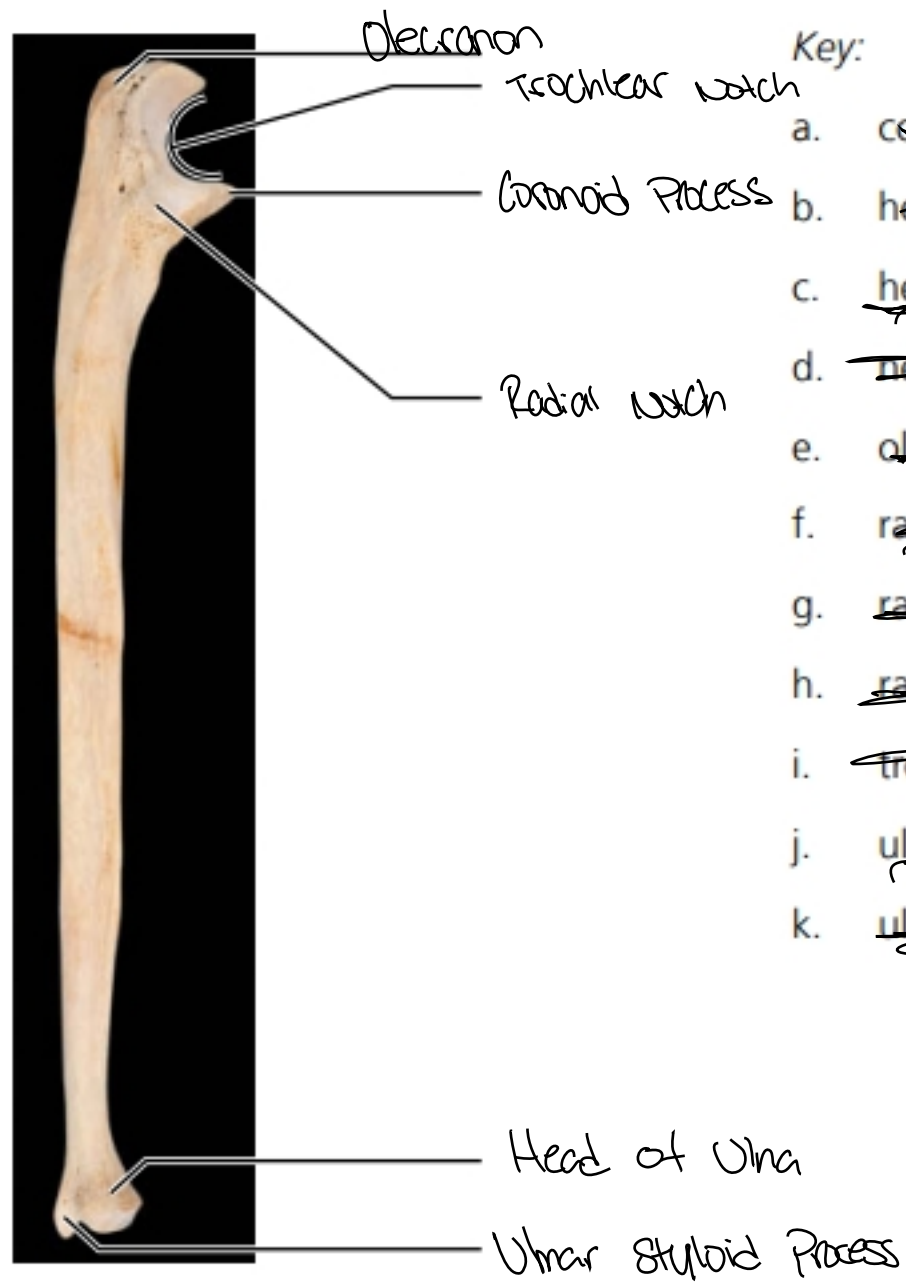
4. Match the terms in the key with the appropriate leader lines on the photograph of the humerus.



Key:

- a. ~~capitulum~~
- b. ~~coronoid fossa~~
- c. ~~deltoid tuberosity~~
- d. ~~greater tubercle~~
- e. ~~head~~
- f. ~~intertubercular sulcus~~
- g. ~~lateral epicondyle~~
- h. ~~lesser tubercle~~
- i. ~~medial epicondyle~~
- j. ~~radial fossa~~
- k. ~~surgical neck~~
- l. ~~trochlea~~

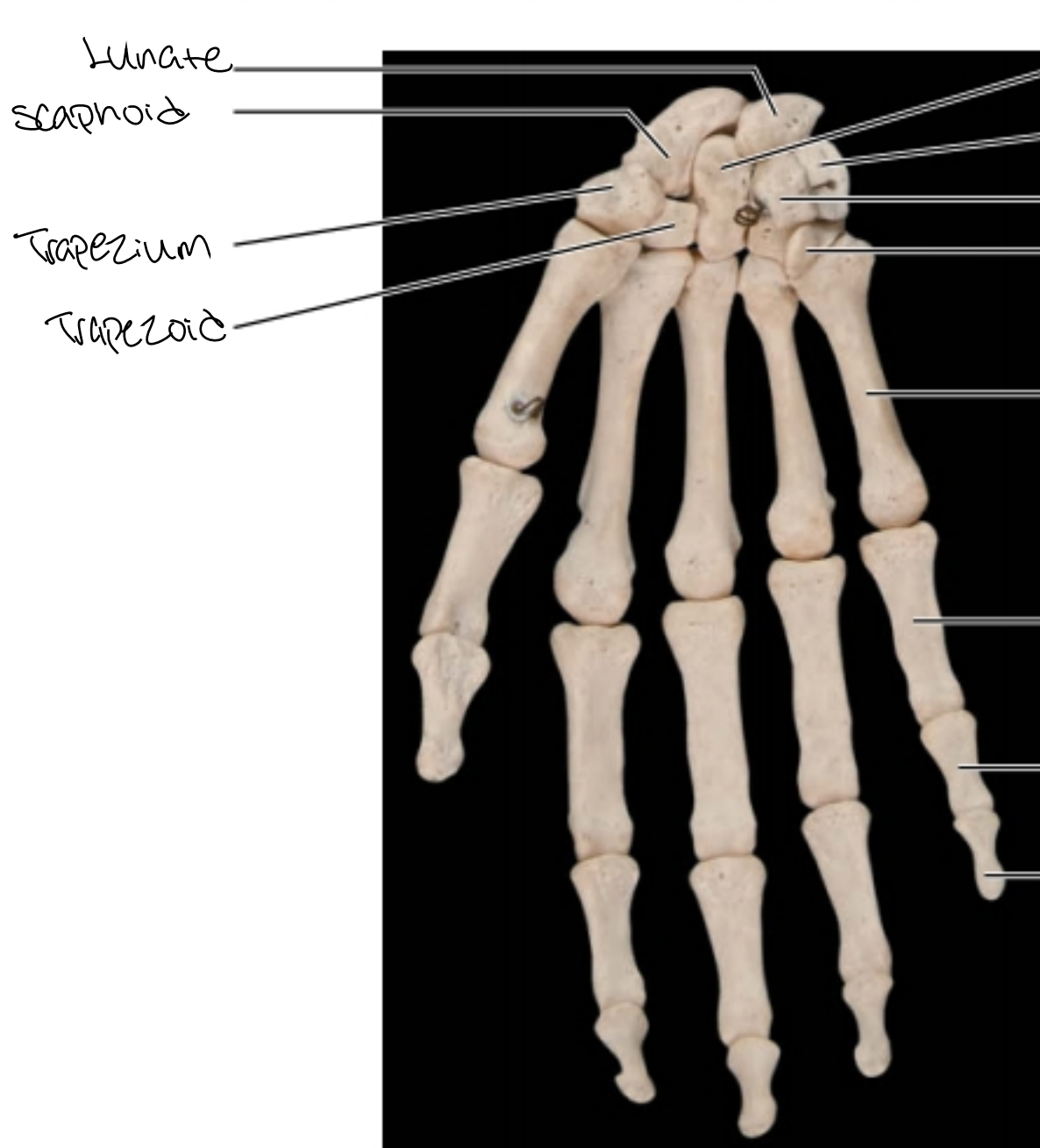
5. Match the terms in the key with the appropriate leader lines on the photographs of the posterior view of the radius on the left and the lateral view of the ulna on the right.



Key:

- a. ~~coronoid process~~
- b. ~~head of the radius~~
- c. ~~head of the ulna~~
- d. ~~neck of the radius~~
- e. ~~olecranon~~
- f. ~~radial notch of the ulna~~
- g. ~~radial styloid process~~
- h. ~~radial tuberosity~~
- i. ~~trochlear notch~~
- j. ~~ulnar notch of the radius~~
- k. ~~ulnar styloid process~~

6. Match the terms in the key with the appropriate leader lines on the photograph of the anterior view of the hand.



Key:

- a. ~~capitate~~
- b. ~~distal phalanx~~
- c. ~~hamate~~
- d. ~~lunate~~
- e. ~~metacarpal~~
- f. ~~middle phalanx~~
- g. ~~pisiform~~
- h. ~~proximal phalanx~~
- i. ~~scaphoid~~
- j. ~~trapezium~~
- k. ~~trapezoid~~
- l. ~~triquetrum~~

7. Name the two bone markings that form the proximal radioulnar joint.

Ulnar radial notch and annular ligament

8. Name the two bone markings that form the distal radioulnar joint.

Radius and ulnar notch

Bones of the Pelvic Girdle and Lower Limb

9. Compare the pectoral and pelvic girdles by choosing appropriate descriptive terms from the key.

Key: a. flexibility most important

b. massive

c. lightweight

d. insecure axial and limb attachments

e. secure axial and limb attachments

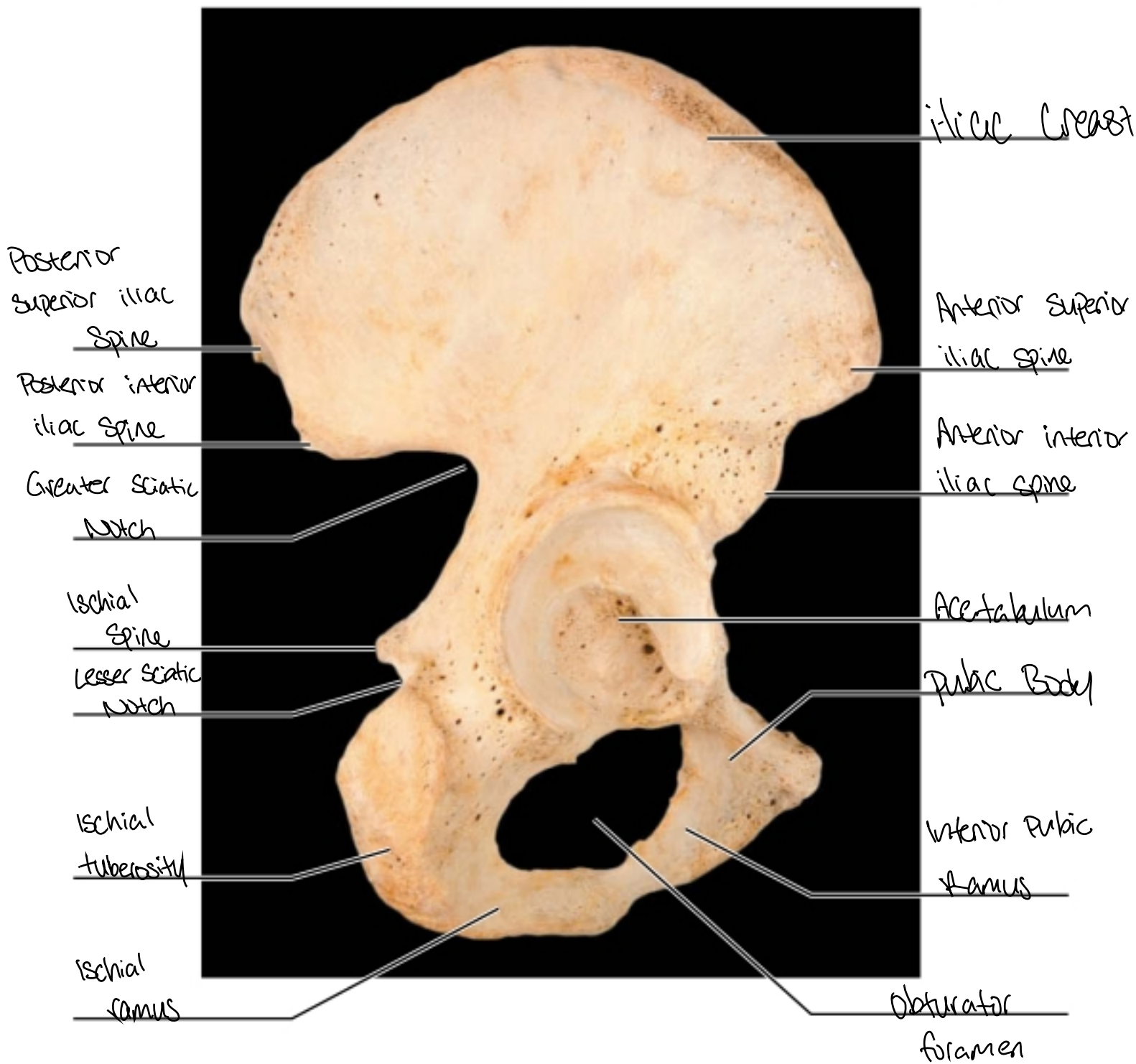
f. weight-bearing most important

Pectoral: massive, ^{secure axial and limb attachment}, ^{weight-bearing most important} Pelvic: lightweight, ^{flexibility most important}, ^{insecure axial and limb attachment}

10. Distinguish between the true pelvis and the false pelvis. True pelvis is the pelvis minor. False pelvis is

the pelvis major space between the iliac fossa -

11. Match the terms in the key with the appropriate leader lines on the photograph of the lateral view of the hip bone.



Key:

- a. ~~acetabulum~~
- b. ~~anterior inferior iliac spine~~
- c. ~~anterior superior iliac spine~~
- d. ~~greater sciatic notch~~
- e. ~~iliac crest~~
- f. ~~inferior pubic ramus~~
- g. ischial ramus
- h. ~~ischial spine~~
- i. ~~ischial tuberosity~~
- j. ~~lesser sciatic notch~~
- k. ~~obturator foramen~~
- l. ~~posterior inferior iliac spine~~
- m. ~~posterior superior iliac spine~~
- n. superior pubic ramus

12. Match the bone names and markings in column B with the descriptions in column A. The items in column B may be used more than once.

Column A

- Ilium, Ischium, and
Pubis 1. fuse to form the hip bone
- Ischial tuberosity 2. rough projection that supports body weight when sitting
- Pubic Symphysis 3. point where the hip bones join anteriorly
- Iliac Crest 4. superiormost margin of the hip bone
- Acetabulum 5. deep socket in the hip bone that receives the head of the thigh bone
- Sacroiliac joint 6. joint between axial skeleton and pelvic girdle
- Femur 7. longest, strongest bone in body
- Fibula 8. thin, lateral leg bone
- Greater Sciatic Notch 9. permits passage of the sciatic nerve
- Lesser Sciatic Notch 10. notch located inferior to the ischial spine
- Tibial tuberosity 11. point where the patellar ligament attaches
- Patella 12. kneecap
- Tibia 13. shinbone
- Medial malleolus 14. medial ankle projection
- Lateral malleolus 15. lateral ankle projection
- Calcaneus 16. largest tarsal bone
- Tarsals 17. ankle bones
- Metatarsals 18. bones forming the instep of the foot
- Obturator Foramen 19. opening in hip bone formed by the pubic and ischial rami
- Gluteal tuberosity and Greater and Lesser Trochanters 20. sites of muscle attachment on the proximal femur
- Talus 21. tarsal bone that "sits" on the calcaneus
- Tibia 22. weight-bearing bone of the leg
- Talus 23. tarsal bone that articulates with the tibia

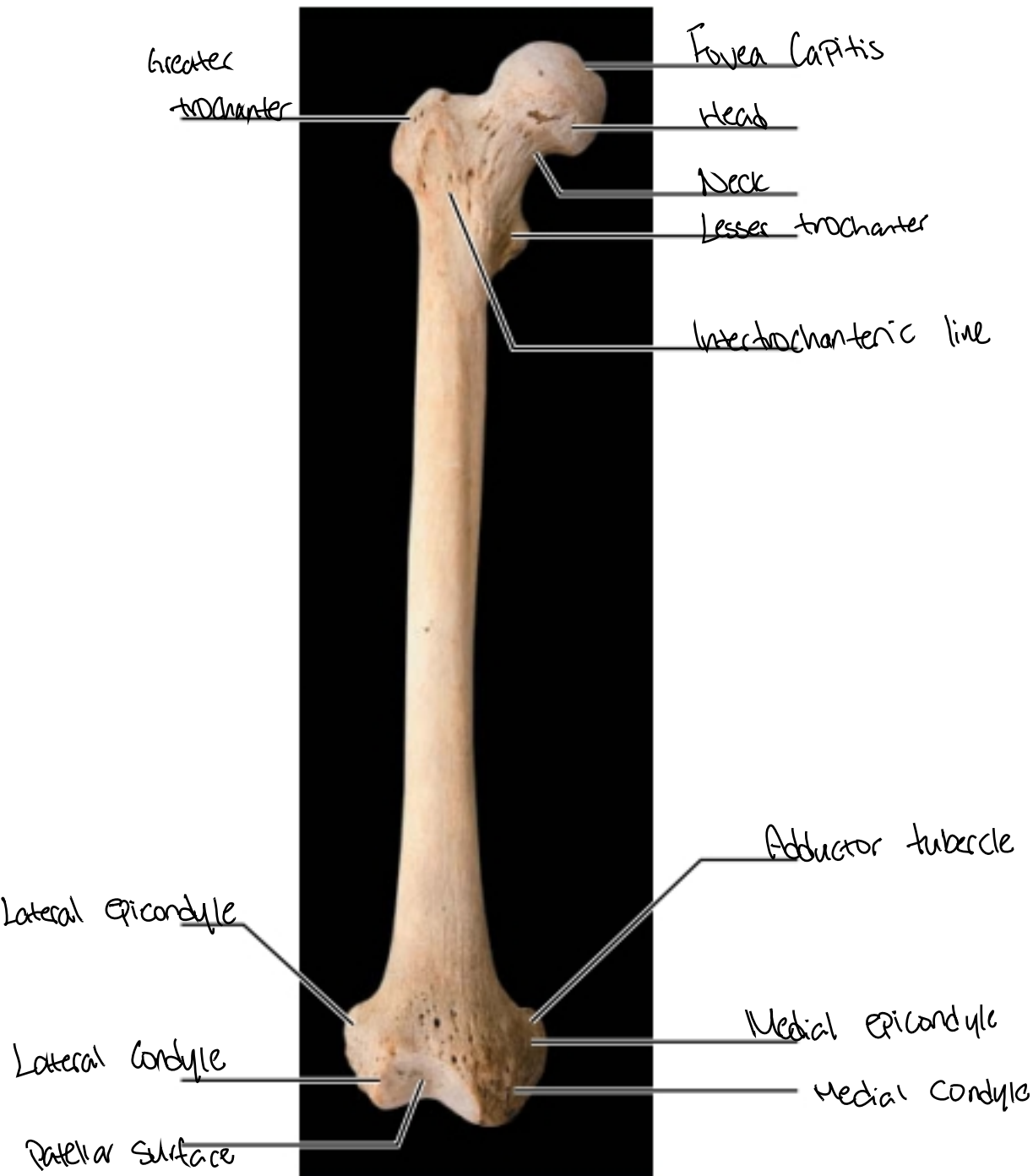
Column B

- a. acetabulum
- b. calcaneus
- c. femur
- d. fibula
- e. gluteal tuberosity
- f. greater and lesser trochanters
- g. greater sciatic notch
- h. iliac crest
- i. ilium
- j. ischial tuberosity
- k. ischium
- l. lateral malleolus
- m. lesser sciatic notch
- n. medial malleolus
- o. metatarsals
- p. obturator foramen
- q. patella
- r. pubic symphysis
- s. pubis
- t. sacroiliac joint
- u. talus
- v. tarsals
- w. tibia
- x. tibial tuberosity

13. Match the terms in the key with the appropriate leader lines on the photograph of the anterior view of the femur.

Key:

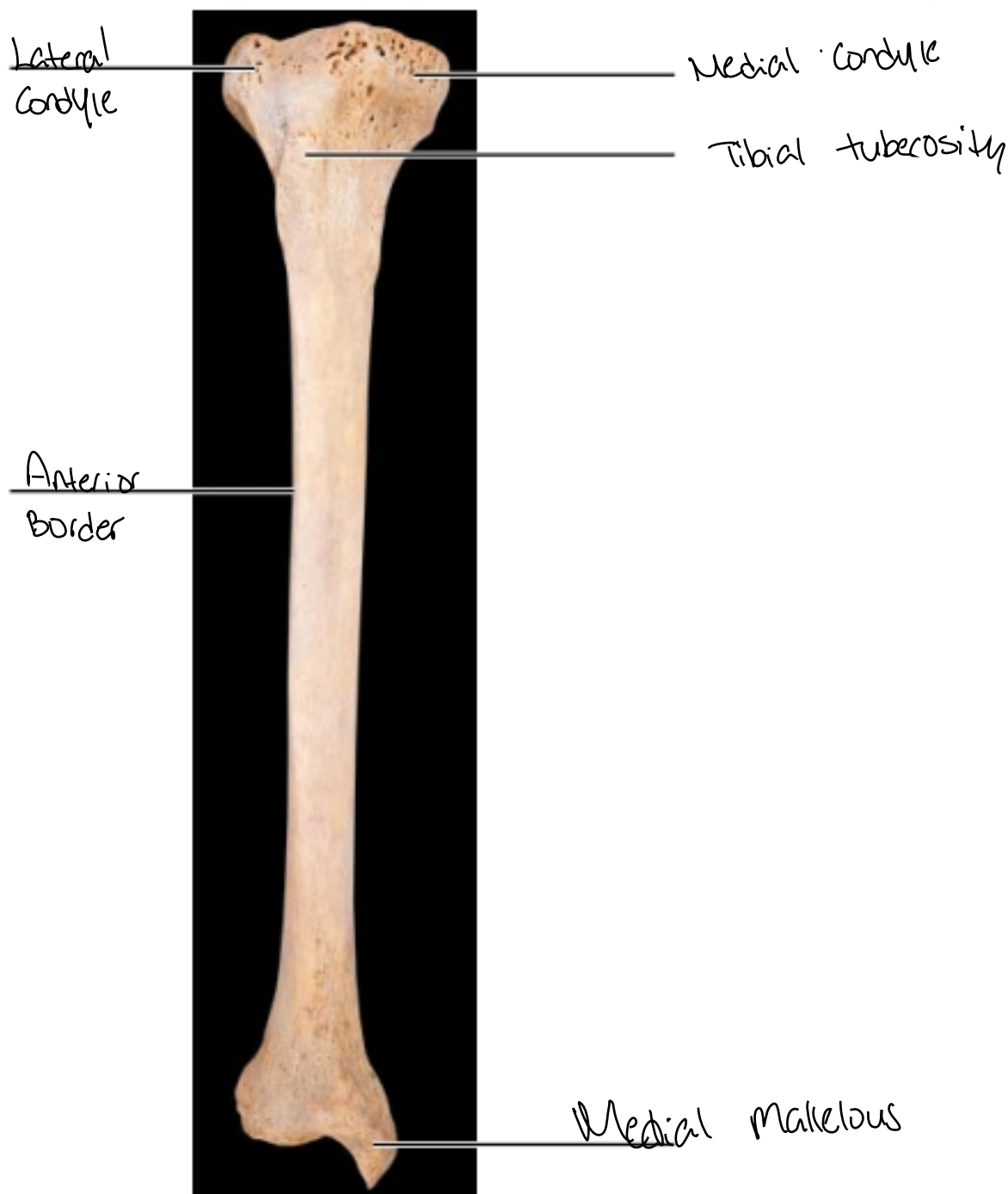
- a. adductor tubercle
- b. fovea capitis
- c. greater trochanter
- d. head
- e. intertrochanteric line
- f. lateral condyle
- g. lateral epicondyle
- h. lesser trochanter
- i. medial condyle
- j. medial epicondyle
- k. neck
- l. patellar surface



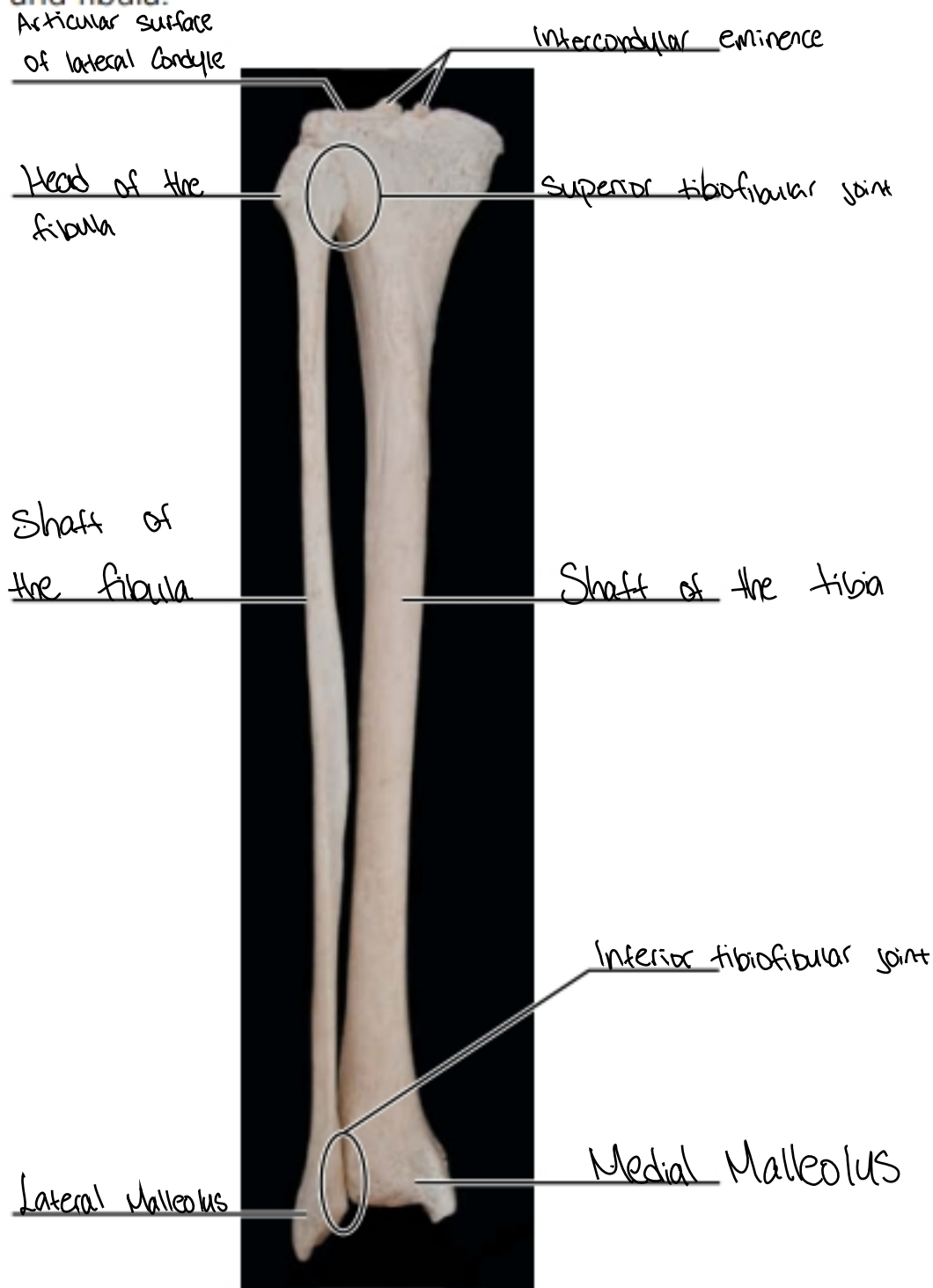
14. Match the terms in the key with the appropriate leader lines on the photograph of the anterior view of the tibia.

Key:

- a. anterior border
- b. lateral condyle
- c. medial condyle
- d. medial malleolus
- e. tibial tuberosity



15. Match the terms in the key with the appropriate leader lines on the photograph of the posterior view of the articulated tibia and fibula.



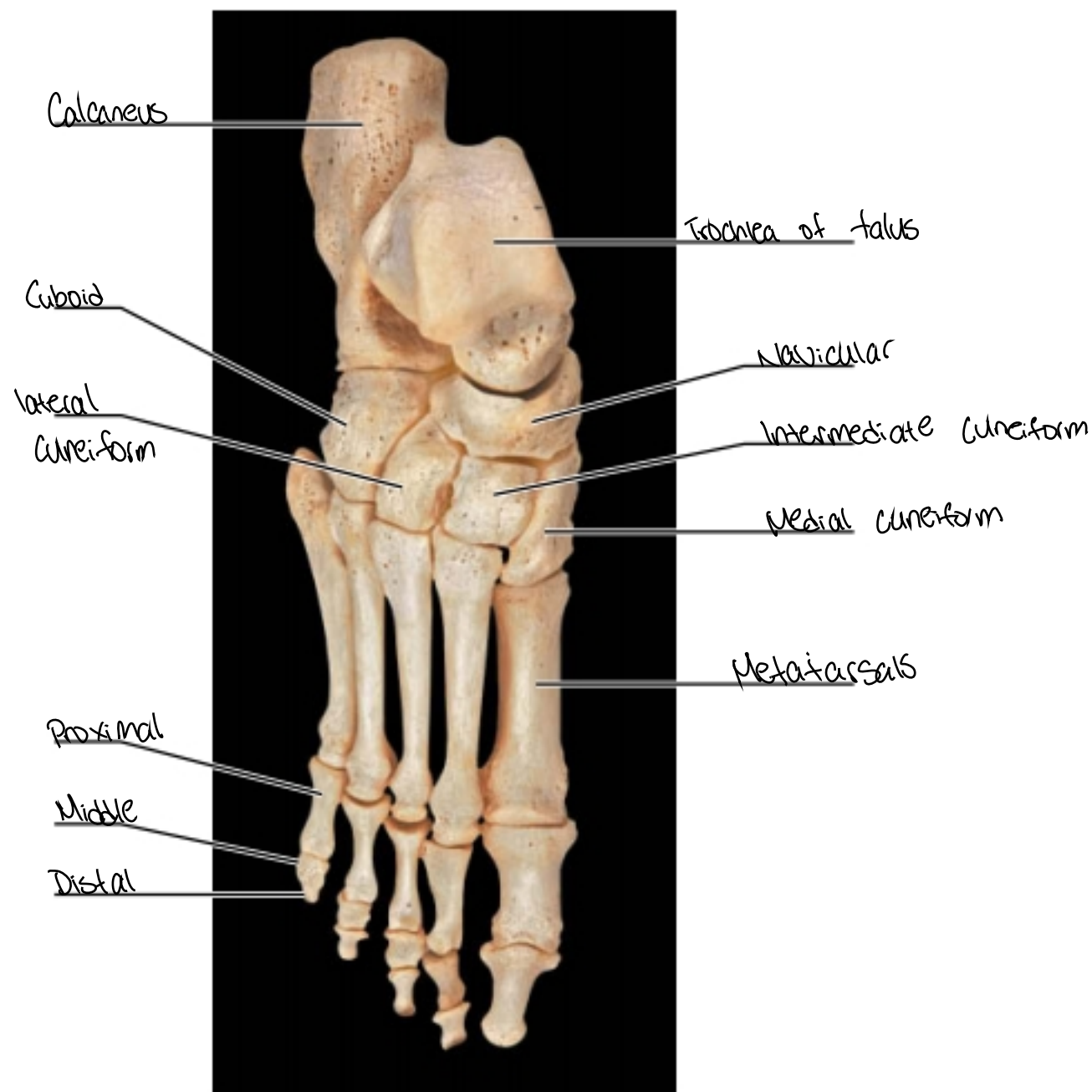
Key:

- a. ~~articular surface of the lateral condyle~~
- b. ~~head of the fibula~~
- c. ~~inferior tibiofibular joint~~
- d. ~~intercondylar eminence~~
- e. ~~lateral malleolus~~
- f. medial malleolus
- g. ~~shaft of the fibula~~
- h. ~~shaft of the tibia~~
- i. ~~superior tibiofibular joint~~

16. Are the bones of the leg shown above from the left or from the right leg? Right

Explain how you can tell which side of the body they are from. Because the picture is showing a anterior view of the leg, which is the person is facing front. Usually when the person is facing you, the fibula is on the left and tibia is on the right.

17. Match the terms in the key with the appropriate leader lines on the photograph of the superior view of the articulated foot.



Key:

- a. ~~calcaneus~~
- b. ~~cuboid~~
- c. ~~distal phalanx~~
- d. ~~intermediate cuneiform~~
- e. lateral cuneiform
- f. ~~medial cuneiform~~
- g. ~~metatarsal~~
- h. ~~middle phalanx~~
- i. ~~navicular~~
- j. proximal phalanx
- k. ~~talus~~

18. **+** FOOSH is an acronym that stands for **F**all on **O**utstretched **H**and. Discuss possible fractures and dislocations that might occur with an injury of this type.

The fractures and dislocation will most likely happen in the wrist because it usually causes when people fall from high place or sport. We usually use our hand to protect ourselves from falling and the hand wrist will be dislocated.

19. **+** Describe some of the features of the female pelvis that provide for compatibility with vaginal birth. The female pelvis must be wide, rounder, and large enough to allow the baby's head go through the birth canal.

20. **+** Your X-ray exam reveals that you have fractured your fibula. Your physician remarks, "Well, it's better than breaking your tibia." Explain why a fracture of the tibia would be worse than a fracture of the fibula. Because tibia have more bone structure and connection than the fibula.