

FINAL WRITTEN EXAMINATION

Study Guide & Handout

Covers. Everything. Days 1–14, all 27 lectures.

The examination. 33% of the course grade. 100 marks. 150 minutes.

Outcomes. CLO 1 through CLO 11.

Emphasis. Terminology and movement 8%; chemical and cellular organization 17%; tissues and cellular change 8%; skeletal foundations and axial skeleton 20%; appendicular skeleton 13%; myology foundations and face, jaw, hyoid 13%; back, trunk, and spinal column 9%; shoulder, arm, forearm, and hand 12%.

Note. The eight topics below are the eight blueprint domains, in that order. The percentage against each topic is the share of the paper it carries — use it to allocate your time.

How to use this guide

Read the topic, then close the guide and answer the review questions in writing from memory. Only then check the key. Recognising a correct answer when you see it is not the same skill as producing one under time pressure, and the assessment tests the second.

The answer key at the end gives the answer and then explains why it is the answer. Read the explanation even where you were right — the reasoning is what earns marks on the applied questions, and it is what you will still have in five years when the list has gone.

Each topic ends with a short "Where students lose marks" list. Those are not generic study tips; they are the specific errors this cohort makes every intake. If you recognise yourself in one, fix it now rather than on the paper.

This is a study guide. It is not an assessment document and nothing in it is graded.

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1. Anatomical Terminology and Movement
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- . Answer key and discussion

Topic 1. Anatomical Terminology and Movement

Approximately 8% of the paper, and the vocabulary every other topic is written in.

Anatomical position: standing erect, facing forward, feet flat and slightly apart, arms at the sides, palms facing ANTERIORLY. Every term below is stated against it.

Planes. Midsagittal divides into equal right and left halves; parasagittal into unequal right and left; frontal (coronal) into anterior and posterior; transverse into superior and inferior.

Directional terms. Superior/inferior, anterior/posterior, medial/lateral, proximal/distal (limbs only), superficial/deep, ipsilateral/contralateral. All are relational — state the whole relationship.

Sagittal-plane movements. Flexion, extension, hyperextension.

Frontal-plane movements. Abduction, adduction, lateral flexion.

Transverse-plane movements. Rotation, protraction, retraction.

Special movements. Supination and pronation (forearm); inversion and eversion (foot); dorsiflexion and plantarflexion (ankle); elevation and depression; opposition (thumb); circumduction, which combines flexion, abduction, extension, and adduction and is not a rotation.

The habit that pays on the examination: for any movement, name the plane. If you can name the plane you have understood the movement; if you cannot, you have memorised a word.

Where students lose marks

- Substituting "up" and "down" for superior and inferior.
- Confusing the sagittal family with the midsagittal member of it.
- Reversing supination and pronation, and confusing supination with lateral rotation of the humerus.

Review questions — Topic 1

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 1.1. Name the plane and the movement: the limb moves away from the midline of the body.
- 1.2. From anatomical position, a client turns the palm to face posteriorly. Name the movement and the bone that moves.
- 1.3. Distinguish protraction from retraction, and name a structure to which both apply.

Topic 2. Chemical and Cellular Organization

Approximately 17% of the paper — the largest single domain after the axial skeleton.

Chemical level

Major elements. Oxygen, carbon, hydrogen, nitrogen — approximately 96% of body mass.

Atomic number. The number of protons. Mass number is protons plus neutrons. Isotopes differ in neutrons only.

Bonds. Ionic — electrons transferred, producing attracting ions. Covalent — electrons shared, equally (non-polar) or unequally (polar). Hydrogen — attraction between partial charges on separate molecules; weak individually, decisive collectively.

pH. Logarithmic. Each unit is a tenfold change in hydrogen ion concentration; lower pH means MORE hydrogen ions. Buffers RESIST a change in pH.

Biomolecules

Carbohydrates. Monosaccharides (glucose), disaccharides (sucrose), polysaccharides (glycogen — the animal storage form).

Lipids. Triglyceride — one glycerol, three fatty acids, the principal energy store. Phospholipid — amphipathic, hydrophilic head and two hydrophobic tails, forms membranes. Steroid — four fused rings.

Proteins. Amino acids joined by peptide bonds. Denaturation disrupts the three-dimensional shape while the primary sequence survives; function is lost because shape is lost. Enzymes are protein catalysts.

ATP. A molecule that TRANSFERS energy, not energy itself.

The cell and the membrane

The bilayer forms spontaneously because the phospholipid is amphipathic. Integral proteins span the membrane and include channels, carriers, and receptors. The fluid mosaic model describes constant lateral motion, not a wall. Permeability is reasoned from polarity and size against the hydrophobic core: small non-polar molecules and lipid-soluble substances pass; ions are excluded by charge; large polar molecules are excluded by both.

Learn the organelles as a production line: nucleus → ribosome on rough ER → rough ER folding → transport vesicle → Golgi → secretory vesicle → plasma membrane → exocytosis. Mitochondria pay for it in ATP.

Membrane transport

Simple diffusion. Down the gradient, through the bilayer. No ATP.

Facilitated diffusion. Down the gradient, through a protein. NO ATP — the gradient supplies the energy; the protein only supplies the route.

Osmosis. The movement of WATER across a selectively permeable membrane. Track the water, never the solute.

Tonicity. Hypotonic — water enters, cell swells and may lyse. Hypertonic — water leaves, cell shrinks. Isotonic — no net movement.

Primary active transport. ATP hydrolysed directly to move a substance AGAINST its gradient. The sodium–potassium pump.

Vesicular transport. Phagocytosis (solids), pinocytosis (fluid), receptor-mediated endocytosis, exocytosis.

The cell cycle

Interphase is G1 (growth, organelle duplication), S (DNA replication), and G2 (final preparation). It is NOT rest. Mitosis runs prophase, metaphase, anaphase, telophase; anaphase is the separation of sister chromatids. Meiosis is division for reproductive cells and produces gametes — that contrast is all this course requires.

Where students lose marks

- Reading the pH scale as linear.
- Assuming facilitated diffusion requires ATP because it uses a protein. The discriminator is the gradient.
- Tracking the solute rather than the water in osmosis and tonicity questions.
- Describing ATP as energy, and interphase as rest.

Review questions — Topic 2

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 2.1.** Facilitated diffusion and primary active transport both use membrane proteins. State the two differences.
- 2.2.** A red blood cell is placed in a hypotonic solution. State the direction of water movement and the effect.
- 2.3.** Why is the primary sequence of a protein unaffected by denaturation, and why does the protein still stop working?
- 2.4.** Trace a secreted protein from gene to extracellular fluid, naming each organelle in order.

Topic 3. Tissues and Cellular Change

Approximately 8% of the paper. Connective tissue is the most practice-relevant material in the whole cellular strand.

The four primary tissue types

Epithelial. Covers and lines. Avascular — it depends on the connective tissue beneath it for nutrients and oxygen, delivered across the basement membrane. Classified by TWO questions only: how many layers (simple, stratified, pseudostratified) and what shape (squamous, cuboidal, columnar). Never by function.

Connective. The most diverse type, and the one massage therapy works with most directly. Comprises cells, fibres, and ground substance. Includes bone, blood, cartilage, adipose, tendon, ligament, and fascia.

Muscle. Skeletal, cardiac, smooth.

Nervous. Neurons and neuroglia.

Connective tissue subtypes

Dense regular. Parallel fibres aligned to a single line of pull. TENDON and LIGAMENT.

Dense irregular. Fibres running in many directions. FASCIA and the DERMIS.

Loose areolar. Open arrangement, abundant ground substance. Binds skin to underlying tissue.

Note that adipose is a connective tissue subtype, not a primary tissue type — a standard distractor. And fascia is not a tissue type; it is an arrangement of connective tissue.

Junctions and repair

Tight junction. Seals adjacent membranes; loss means leakage between cells.

Desmosome. Anchors adjacent cells against MECHANICAL STRESS.

Hemidesmosome. Anchors a cell to the basement membrane.

Gap junction. Tunnels allowing direct passage between cells.

Regeneration. Replacement with the same tissue type. Function restored.

Fibrosis. Replacement with collagenous scar. Function not fully restored. These are different outcomes.

Neoplasia

Benign tumours remain local; malignant tumours invade. Metastasis is spread from the primary site to a DISTANT site. Tumours are classified by tissue of origin. This material supports referral literacy only — students do not screen, diagnose, or advise on cancer, and any suspicious finding is a physician referral.

Where students lose marks

- Classifying epithelium by function rather than by layers and shape.
- Naming adipose as a primary tissue type.
- Assigning tendon and ligament to dense irregular. They are dense REGULAR.
- Treating regeneration and fibrosis as the same outcome.
- Assuming "tumour" means "cancer."

Review questions — Topic 3

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 3.1.** Tendon and ligament are which connective tissue subtype, and what feature of that subtype explains their function?
- 3.2.** Epithelium is avascular. State the most important consequence for healing.
- 3.3.** Distinguish regeneration from fibrosis.
- 3.4.** Which junction would you expect to predominate in tissue subject to high mechanical stress, and why?

Topic 4. Skeletal Foundations and the Axial Skeleton

Approximately 20% of the paper — the single largest domain. Give it time.

Bone as an organ

Bone is CONNECTIVE tissue. The six functions of the skeletal system: support; protection; movement (as levers for muscles); mineral storage, chiefly calcium and phosphorus; haematopoiesis in red marrow; triglyceride storage in yellow marrow.

Classification by shape. Long (humerus, femur), short (carpals, tarsals), flat (sternum, scapula, most cranial bones), irregular (vertebrae, sphenoid), sesamoid (patella — develops within a tendon).

Bone tissue. Compact bone's structural unit is the OSTEON; spongy bone is built of trabeculae.

Remodelling. Bone responds over time to the mechanical loads placed on it. It is not inert. It cannot, however, be reshaped directly by manual pressure — that is outside scope and appears as a distractor.

Axial vs appendicular. Axial: skull, vertebral column, ribs, sternum. Appendicular: the girdles and the limbs. The scapula and clavicle are APPENDICULAR.

Bone markings — three families

Projections. Process, tubercle, tuberosity, trochanter, crest, line, spine, head, condyle, epicondyle.

Depressions. Fossa, sulcus, notch.

Openings. Foramen, meatus, sinus.

Cranium and face

Foramen magnum. In the OCCIPITAL bone. Transmits the brainstem and spinal cord — which is what makes the occipital condyles significant.

Mastoid process. On the TEMPORAL bone, posterior and inferior to the external acoustic meatus. Commonly and wrongly attributed to the occipital bone.

Sella turcica. On the sphenoid.

Sutures. Coronal (frontal to parietals), sagittal (between parietals), lambdoid (parietals to occipital), squamous (temporal to parietal).

Zygomatic arch. Formed by TWO bones — the temporal and the zygomatic.

The orbit. Formed by frontal, zygomatic, maxilla, lacrimal, ethmoid, sphenoid, and palatine. The NASAL bone does not contribute.

Mandible. The condylar process articulates with the mandibular fossa of the temporal bone. The coronoid process receives the temporalis.

Vertebral column

Cervical. The TRANSVERSE FORAMEN identifies a vertebra as cervical at every level. Bifid spinous processes are present at some levels only. Atlas (C1) is a ring with no body — nodding at the atlanto-occipital joint. Axis (C2) bears the DENS — rotation at the atlanto-axial joint. C7 is the vertebra prominens, the counting landmark.

Thoracic. COSTAL FACETS receive the ribs. Facets oriented in the FRONTAL plane, permitting rotation.

Lumbar. Large kidney-shaped body; short, broad spinous process. Facets oriented in the SAGITTAL plane and interlocking, which BLOCKS rotation.

Discs. Annulus fibrosus (outer fibrocartilage ring) and nucleus pulposus (inner gel core). Function: shock absorption, load distribution, permitting movement, maintaining intervertebral foramen height. A disc does not "slip."

Curves. Thoracic and sacral are primary, present at birth. Cervical and lumbar are SECONDARY, developing as the infant lifts the head and begins to walk.

The reasoning item to prepare

Thoracic facets lie in the frontal plane, so the facet surfaces can slide across one another about a vertical axis and rotation is comparatively free. Lumbar facets lie in the sagittal plane and interlock, blocking the sliding that rotation requires, so lumbar rotation is very limited. Size is not the mechanism — "lumbar vertebrae are bigger" explains nothing.

Where students lose marks

- Attributing the mastoid process to the occipital bone.
- Naming the transverse foramen as the vertebral foramen, or the bifid spine as the cervical identifier.
- Attributing the dens to the atlas rather than the axis.
- Explaining lumbar rotation by vertebral size rather than facet orientation.
- Calling the scapula or clavicle axial.

Review questions — Topic 4

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 4.1. Which single feature identifies a vertebra as cervical, regardless of level, and why is the bifid spinous process not the answer?
- 4.2. Compare the facet orientation of a typical thoracic and a typical lumbar vertebra, and state the consequence for rotation in each region.
- 4.3. State three functions of the skeletal system other than support and movement.
- 4.4. The patella is which class of bone, and what defines that class?
- 4.5. Name the two structural components of an intervertebral disc and state one function.

Topic 5. The Appendicular Skeleton

Approximately 13% of the paper. Nearly every landmark here is a muscle attachment you meet again in the myology domains.

Pectoral girdle

Clavicle. The ONLY bone connecting the upper limb to the axial skeleton. Articulates with the manubrium medially and the acromion laterally.

Scapula. Spine; acromion (the lateral end of the spine, the bony point of the shoulder); coracoid process (the anterior hook from the superior border); glenoid fossa; supraspinous fossa (ABOVE the spine); infraspinous fossa (BELOW the spine); subscapular fossa (the ANTERIOR surface); borders and angles; suprascapular notch.

Humerus. Head; anatomical neck; surgical neck (a common fracture site — the axillary nerve runs here); greater tubercle (lateral); lesser tubercle (anterior); INTERTUBERCULAR (bicipital) GROOVE between them, carrying the tendon of the long head of biceps brachii; deltoid tuberosity; MEDIAL epicondyle (the common FLEXOR origin) and LATERAL epicondyle (the common EXTENSOR origin).

Forearm and hand

Ulna. MEDIAL. Olecranon — the point of the elbow; it limits EXTENSION by entering the olecranon fossa. Trochlear notch; coronoid process; styloid process (medial wrist).

Radius. LATERAL, thumb side. Head spins in the radial notch during pronation and supination; radial tuberosity receives biceps brachii; styloid process (lateral wrist).

Carpals. Proximal row, lateral to medial: scaphoid, lunate, triquetrum, pisiform. Distal row: trapezium, trapezoid, capitate, hamate. The SCAPHOID forms the floor of the anatomical snuffbox and is the most commonly fractured carpal.

Pelvis and lower limb

Os coxae. Ilium, ischium, and pubis, fused at the ACETABULUM. The sacrum is axial and is not part of it.

Iliac crest and ASIS. The crest is the whole superior border of the ilium. The ASIS is the ANTERIOR TERMINATION of the crest. They are the two most-used bony references in the program and must be distinguished.

Femur. Head (deep in the acetabulum, NOT palpable); greater trochanter (palpable, lateral); lesser trochanter; linea aspera; condyles and epicondyles.

Tibia and fibula. Tibia is the weight-bearing bone and carries the MEDIAL malleolus. Fibula is not weight-bearing and carries the LATERAL malleolus, which extends further DISTALLY than the medial.

Foot. Talus (no muscle attachments — unique among the tarsals); calcaneus (heel); navicular; cuboid; three cuneiforms. Arches: medial longitudinal, lateral longitudinal, transverse. They are DYNAMIC — they lower to absorb load and recoil to assist propulsion.

The reasoning item to prepare

The glenoid fossa is shallow and small relative to the humeral head, so little of the head is contained by bone: the joint is free to move in every plane, and stability comes from soft tissue — labrum, capsule, ligaments, and above all the rotator cuff as a dynamic stabiliser. The acetabulum is deep and encloses much of the femoral head, so bony architecture supplies the stability and transmits weight. Containment, not joint type: both are ball-and-socket joints.

Where students lose marks

- Reversing the radial and ulnar styloid processes. Radius is lateral, thumb side.
- Believing the ulna rotates during pronation. The radius moves.
- Confusing the iliac crest with the ASIS.
- Naming the femoral head as the palpable lateral hip landmark. It is the greater trochanter.
- Reversing the common flexor and common extensor origins. Flexors medial, extensors lateral.
- Explaining shoulder mobility by "it is a ball-and-socket joint." So is the hip.

Review questions — Topic 5

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 5.1. Explain why the glenohumeral joint has a greater range of motion but less bony stability than the hip.
- 5.2. Which movement does the olecranon limit, and by what mechanism?
- 5.3. Name the proximal carpal row, lateral to medial, and state which one underlies the anatomical snuffbox.
- 5.4. Which malleolus extends further distally, and to which bone does it belong?
- 5.5. Where is the common flexor origin, and where is the common extensor origin?

Topic 6. Myology Foundations; Face, Jaw, and Hyoid

Approximately 13% of the paper. The foundations here are the framework every remaining myology topic uses.

Foundations

Muscle tissue. Skeletal — striated, voluntary, multinucleated. Cardiac — striated, INVOLUNTARY, branched, intercalated discs. Smooth — non-striated, involuntary, spindle-shaped.

Tendon and aponeurosis. A tendon is cord-like; an aponeurosis is a flat, sheet-like tendon spreading pull over a broad area.

Origin and insertion. Origin is the MORE FIXED attachment; insertion the MORE MOBILE one. Not proximal and distal. The roles reverse when the usual insertion is fixed.

Contraction types. Concentric — tension with shortening. Eccentric — tension while LENGTHENING under load; the muscle is working, not relaxing. Isometric — tension with no length change and no joint movement.

Roles. Agonist (prime mover), antagonist, synergist, fixator (stabilizer). Roles are relative to the MOVEMENT, not fixed properties of a muscle.

Leverage. Joint = fulcrum. Bone = lever. Muscle = effort. Body part plus load = resistance.

Mastication

Temporalis. Temporal fossa → coronoid process. Elevates AND RETRACTS.

Masseter. Zygomatic arch → angle and lateral ramus. Elevates powerfully.

Medial pterygoid. Lateral pterygoid plate → medial surface of the ramus. Elevates; forms a sling with the masseter around the ramus.

Lateral pterygoid. Sphenoid → neck of mandible and articular disc. PROTRACTS and assists depression. The odd one out: the other three close the jaw.

Facial expression

These muscles insert into SKIN and superficial fascia, not bone. They do have bony origins. Because no joint is crossed, the action cannot be stated as a joint movement — the muscle moves skin. Orbicularis oris closes and purses the lips; orbicularis oculi closes the eyelids; zygomaticus major draws the angle of the mouth superolaterally; buccinator compresses the cheek against the teeth; occipitofrontalis raises the eyebrows.

The hyoid region

The hyoid articulates with NO other bone. It is held by the balanced pull of the suprahyoid group (mylohyoid, geniohyoid, stylohyoid, digastric) and the infrahyoid group (sternohyoid, omohyoid, sternothyroid, thyrohyoid). Suprahyoids elevate the hyoid when the mandible is fixed, and depress the mandible when the hyoid is fixed. Infrahyoids depress the hyoid. The digastric and the omohyoid each have two bellies and an intermediate tendon.

Where students lose marks

- Defining origin as the proximal attachment.
- Describing eccentric contraction as relaxation, or as gravity doing the work.
- Treating agonist and antagonist as fixed labels.
- Missing the lateral pterygoid's protraction role because it sits among elevators.
- Believing facial muscles have no origin, or that the hyoid articulates with the mandible.

Review questions — Topic 6

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 6.1. A person lowers a heavy box slowly and with control. What are the elbow flexors doing?
- 6.2. Which muscle of mastication protracts the mandible, and why is it easily missed?
- 6.3. When the hyoid is fixed by the infrahyoid muscles, what will contraction of the suprahyoid muscles do?
- 6.4. Why does the classical origin–insertion model describe the muscles of facial expression poorly?

Topic 7. The Back, Trunk, and Spinal Column

Approximately 9% of the paper. Every origin here is a landmark from the skeletal strand.

Trapezius — one muscle, three actions

Upper fibres. External occipital protuberance, nuchal lines and ligament → lateral clavicle and acromion. ELEVATE the scapula.

Middle fibres. Spinous processes C7–T3 → acromion and scapular spine. RETRACT the scapula.

Lower fibres. Spinous processes T4–T12 → medial end of the scapular spine. DEPRESS the scapula.

The upper and lower fibres do opposite things. The reason is fibre DIRECTION relative to the scapula — not two nerves, not two tissue types. This is the clearest demonstration in the course that one muscle can act regionally.

The rest of the superficial group

Latissimus dorsi. Origin includes spinous processes T7–L5, the THORACOLUMBAR FASCIA, the ILIAC CREST, lower ribs, and the inferior angle of the scapula. Inserts in the INTERTUBERCULAR GROOVE of the humerus. Extends, adducts, and MEDIALY ROTATES the humerus.

Levator scapulae. Transverse processes C1–C4 → superior angle of the scapula. ELEVATES the scapula.

Rhomboid major and minor. Spinous processes → medial border of the scapula. RETRACT the scapula.

Why does latissimus dorsi medially rotate? Because its insertion, the intertubercular groove, lies ANTERIOR to the long axis of the humerus. Pulling on a point anterior to the axis spins the anterior surface medially. Reason it from the insertion rather than memorising it.

The three groups

Superficial. Trapezius, latissimus dorsi, levator scapulae, rhomboids.

Intermediate. Serratus posterior superior and inferior.

Deep. Spinotransverse layer — splenius capitis and splenius cervicis. Erector spinae — iliocostalis, longissimus, spinalis. Multifidus.

The splenius muscles are DEEP, not superficial. Draw the layers as a cross-section and the sorting becomes obvious; without the cross-section it is arbitrary.

Where students lose marks

- Treating trapezius as a single-action muscle.
- Restricting the latissimus origin to the spine, omitting the thoracolumbar fascia and iliac crest.
- Conflating levator scapulae (elevates) with the rhomboids (retract).
- Placing the splenius muscles in the superficial group.

Review questions — Topic 7

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 7.1.** How can the upper and lower fibres of trapezius produce opposite actions on the scapula?
- 7.2.** Latissimus dorsi inserts into the intertubercular groove. Explain why this produces medial rotation.
- 7.3.** Name the three groups of back muscles and place the splenius muscles.
- 7.4.** Name three origins of latissimus dorsi other than the spinous processes.

Topic 8. The Shoulder, Arm, Forearm, and Hand

Approximately 12% of the paper, all delivered on the last teaching day. Compartment organization is what makes it manageable.

The rotator cuff

Derive it, do not memorise it. Each muscle originates in a fossa of the scapula and inserts on a tubercle of the humerus, and the action follows from those two facts.

Supraspinatus. Supraspinous fossa → greater tubercle. INITIATES abduction.

Infraspinatus. Infraspinous fossa → greater tubercle. Laterally rotates.

Teres minor. Lateral border of the scapula → greater tubercle. Laterally rotates and adducts.

Subscapularis. Subscapular fossa, the ANTERIOR surface → LESSER tubercle. MEDIALY rotates.

Three insert on the greater tubercle and abduct or laterally rotate. One — subscapularis — comes from the anterior surface, inserts on the lesser tubercle, and medially rotates. Teres MAJOR is not a cuff muscle and is the standard distractor.

The cuff exists because the glenoid fossa contains so little of the humeral head. It acts as a DYNAMIC STABILISER, holding the head in the fossa throughout movement — including when no rotation is occurring.

The arm

Biceps brachii. Anterior. Flexes the elbow and SUPINATES the forearm. Crosses BOTH shoulder and elbow — a two-joint muscle. The long head tendon runs in the intertubercular groove.

Brachialis. Anterior. The workhorse elbow flexor, in any forearm position. Crosses the elbow only.

Coracobrachialis. Anterior. Acts at the shoulder only.

Triceps brachii. Posterior. Three heads. Extends the elbow; the long head also crosses the shoulder.

Biceps brachii is a stronger elbow flexor in supination than in pronation, because in pronation the radius rotates so that the tendon wraps around it, reducing mechanical advantage.

The forearm — two facts

ANTERIOR compartment: common flexor origin on the MEDIAL epicondyle. Flexes the wrist and fingers; pronates. Pronator teres, flexor carpi radialis, palmaris longus (variably absent), flexor carpi ulnaris, flexor digitorum superficialis and profundus, flexor pollicis longus, pronator quadratus.

POSTERIOR compartment: common extensor origin on the LATERAL epicondyle. Extends the wrist and fingers; supinates. Brachioradialis, extensor carpi radialis longus and brevis, extensor digitorum, extensor carpi ulnaris, supinator, abductor pollicis longus, extensor pollicis brevis and longus.

The hand

Thenar. Acts on the thumb.

Hypothenar. Acts on the fifth digit.

Lumbricals. Flex the MCP joints, extend the IP joints. Arise from the flexor digitorum profundus tendons.

Interossei. Palmar ADduct, dorsal ABduct.

Palmar aponeurosis. The worked example of an aponeurosis from the introduction to myology, returning here.

Where students lose marks

- Including teres major in the rotator cuff.
- Naming the cuff from a mnemonic without being able to locate the insertions.
- Treating biceps brachii as a pure elbow flexor with no shoulder action and no role in supination.
- Reversing the common flexor and common extensor origins.
- Assuming palmaris longus is present in everyone.
- Believing the cuff is inactive when the humerus is not rotating. It stabilises throughout.

Review questions — Topic 8

Answer these from memory, in writing, before you check the key. Recognising an answer is not the same as producing one.

- 8.1.** Which muscle is not part of the rotator cuff: supraspinatus, infraspinatus, teres major, or subscapularis?
- 8.2.** Subscapularis is the only cuff muscle that medially rotates. Explain why, from its attachments.
- 8.3.** Why is biceps brachii a stronger elbow flexor in supination than in pronation?
- 8.4.** A therapist applies sustained pressure through the heel of the hand with the elbow extended and the shoulder flexed. What is the rotator cuff doing?
- 8.5.** What single fact makes each forearm compartment learnable, and what is that fact for each?

