Solutions

Marking: **M1** a correct method, **A1** the correct answer, **B1** an independent mark.

Each answer shows the steps, then the **result**.

2.1

the elbow is **proximal** to the wrist

the sternum is **anterior** to the heart

in the anatomical position, the thumb is **lateral** to the little finger

2.2

A: **sagittal**

B: **coronal**

2.3

A (−1000): **air**, such as lung or gas in the bowel

B (0): **water**, such as urine or a fluid cyst

C (+700): **bone**

2.4

$8 \div 0.02 = \mathbf{400}$ chest X-rays

$8 \div 2.7 \approx \mathbf{3}$ years of background radiation

3.1

(a) axial slices are viewed from the patient's feet, so the image left is the patient's **right** kidney

(b) superior and inferior; left and right

(c) mark the site on the skin while the patient is awake and agrees; check the side against labelled images, with the L/R marker; a team time-out on the safety checklist before the cut

3.2

(a) **ultrasound**; no ionising radiation for the fetus; stones reflect sound strongly and cast a shadow, so they show clearly, and the test is quick at the bedside

(b) CT is fast and widely available; fresh blood is denser than brain, so it looks bright on CT

3.3

(a) $1000 \times \dfrac{0.200 - 0.190}{0.190} \approx \mathbf{53}$ HU

(b) $1000 \times \dfrac{0 - 0.190}{0.190} = -1000$

(c) $-100 = 1000 \times \dfrac{\mu - 0.190}{0.190}$, so $\mu = 0.190 \times 0.9 = \mathbf{0.171}$ per cm

(d) close to water (0 HU): a **fluid cyst**

(e) $3 \times 8 = 24$ mSv; $24 \div 2.7 \approx \mathbf{9}$ years

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