chest + swimmer

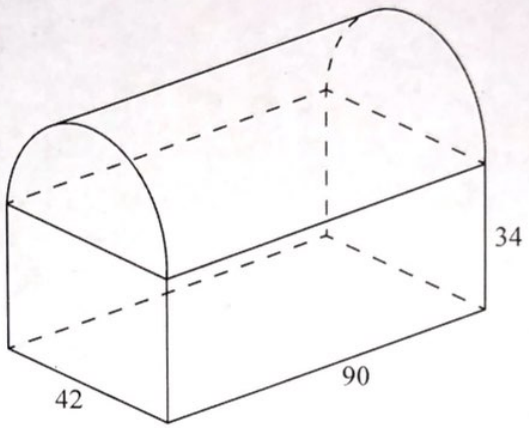
So Lvdons

3. [Maximum mark: 7]

A storage container consists of a box of length 90 cm, width 42 cm and height 34 cm, and a lid in the shape of a half-cylinder, as shown in the diagram. The lid fits the top of the box exactly. The total exterior surface of the storage container is to be painted.

Find the area to be painted.

diagram not to scale



Lid:

LSA = $\frac{1}{2}\pi 42 \cdot 90 = 1890\pi$

ends = $\pi\left(\frac{42}{2}\right)^2 = 441\pi$

total = 2331π

Box:

sides $2(34 \cdot 90)$

ends $+ 2(42 \cdot 34)$

bottom $+ (42 \cdot 90)$

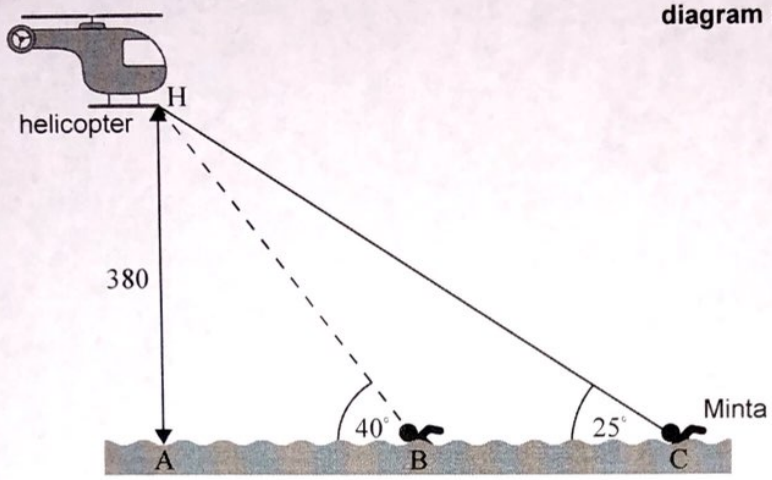
$= 12{,}756$

Total: $12{,}756 + 2331\pi$ cm^2

4. [Maximum mark: 7]

The diagram below shows a helicopter hovering at point H, 380 m vertically above a lake. Point A is the point on the surface of the lake, directly below the helicopter.

diagram not to scale



Minta is swimming at a constant speed in the direction of point A. Minta observes the helicopter from point C as she looks upward at an angle of 25°. After 15 minutes, Minta is at point B and she observes the same helicopter at an angle of 40°.

(a) Write down the size of the angle of depression from H to C. [1]

(b) Find the distance from A to C. [2]

(c) Find the distance from B to C. [3]

(d) Find Minta's speed, in metres per hour. [1]

a) 25°

b) $\tan 25° = 380/AC$

$AC = 380/\tan 25 = 814.9126...$

≈ 815 m

c) $AB = 380/\tan 40$

$= 452.866...$

$BC = 814.9126... - 452.866... = 362.0462...$

≈ 362 m

d) $S = 362 \times \frac{60}{15} = 1448.185...$

≈ 1450 m/hr