2021 LCOL Paper 2 Q8

This section is to be completed having corrected the question. **Enter your score in the box above ↑.**

Thoughts (Easy/ Hard, State the Topic, Links to other Topics, Similar Questions?)

What formulae or rules did I need? Is there anything I should learn off?

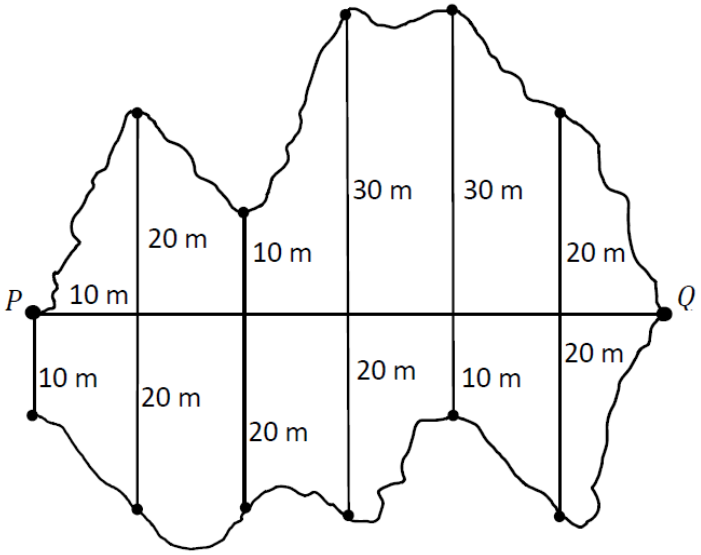
Is there anything I still don't understand? What do I need to revise? Should I return to this question?

▶ 2021 LCOL Paper 2 – Question 8 (a)

The diagram on the right shows the plan of a lake.

The line segment $[PQ]$ represents the distance from the pier, P, to the far side of the lake.

At equal intervals of 10 m along this line, perpendicular measures are made to the sides of the lake as shown.



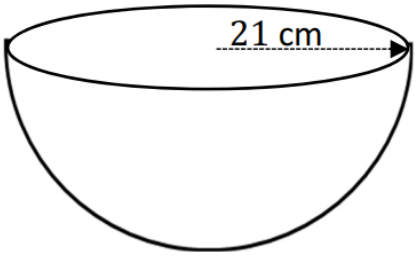
(i) Use the Trapezoidal Rule to estimate the **surface area** of the lake.

(ii) If the lake is on average 8 m deep, estimate the volume of water in the lake.

▶ 2021 LCOL Paper 2 – Question 8 (b)

(i) Calculate the **volume**, in cm^3, of a hemisphere of radius 21 cm.

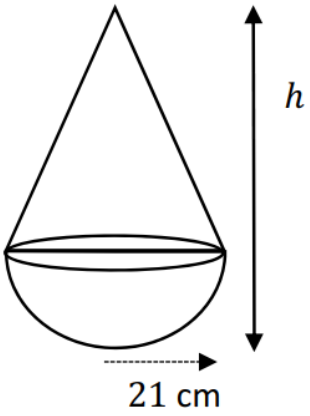
Give your answer terms of π.



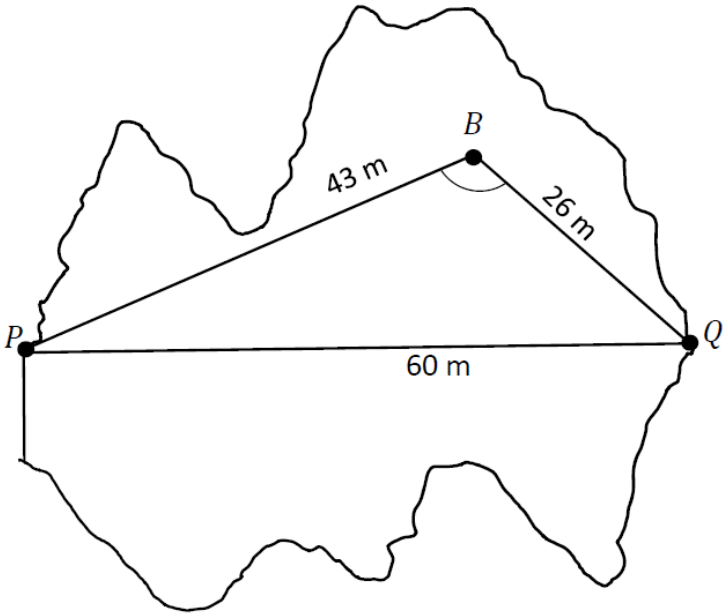
(ii) A buoy on the lake is in the shape of a hemisphere of radius 21 cm surmounted by a cone.

The volume of the cone is equal to the volume of the hemisphere.

Find h, the **total height** of the buoy.



▶ 2021 LCOL Paper 2 – Question 8 (c)



The buoy is situated at B, 43 m from the pier P and 26 m from the point Q, as shown in the diagram above.

Find $|\angle QBP|$, the angle at the buoy shown on the diagram.

Give your answer correct to two decimal places.