

FACULTY NOTES

The LTAs and Spinoffs are designed so that each professor can implement them in a way that is consistent with his/her teaching style and course objectives. This may range from using the materials as out-of-class projects with minimal in-class guidance to doing most of the work in class. The LTAs and Spinoffs are amenable to small group cooperative work and typically benefit from the use of some learning technology. Since the objective of the LTAs and Spinoffs is to support the specific academic goals you have set for your students, the Faculty Notes are not intended to be prescriptive. The purpose of the Faculty Notes is to provide information that assists you to take full advantage of the LTAs and Spinoffs. This includes suggestions for instruction as well as answers for the exercises.



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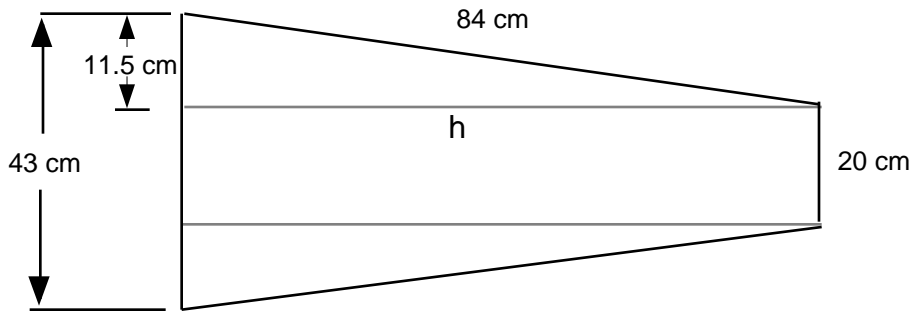
SPINOFF 6A

Design of a Lunar Base Station Biomass Production Chamber

Solutions

- 1) To find the length h , we use the Pythagorean formula: $c^2 = a^2 + b^2$ with $c = 84$ cm and $a = 11.5$ cm. So, the missing side b is the same as h and is given by:

$$h = \sqrt{84^2 - 11.5^2} \quad 83.21 \text{ cm}$$



Therefore, using the formula for the area of a trapezoid, we have:

$$\begin{aligned} \text{Area} &= \frac{1}{2} (43 + 20)(83.21) = 2621.12 \text{ cm}^2 \\ &= 0.262112 \text{ m}^2. \end{aligned}$$

- 2) Since the total area of 350 m^2 is needed to grow biomass to support the crew of eight, the chamber needs to have $350/0.262112 = 1336$ trays (rounded up to the nearest whole number).
- 3) The number of rows needed: $1336/16 = 84$ rows (rounded up to the nearest whole number).
The number of chambers needed: $84/4 = 21$ chambers.