



SNS COLLEGE OF TECHNOLOGY

**An Autonomous Institution
Coimbatore - 35**

Accredited by NBA – AICTE and Accredited by NACC – UGC with 'A+ Grade
Approved by AICTE, New Delhi and Affiliated to Anna University, Chennai.

DEPARTMENT OF AGRICULTURE ENGINEERING

19AGT201 – SURVEYING AND LEVELING

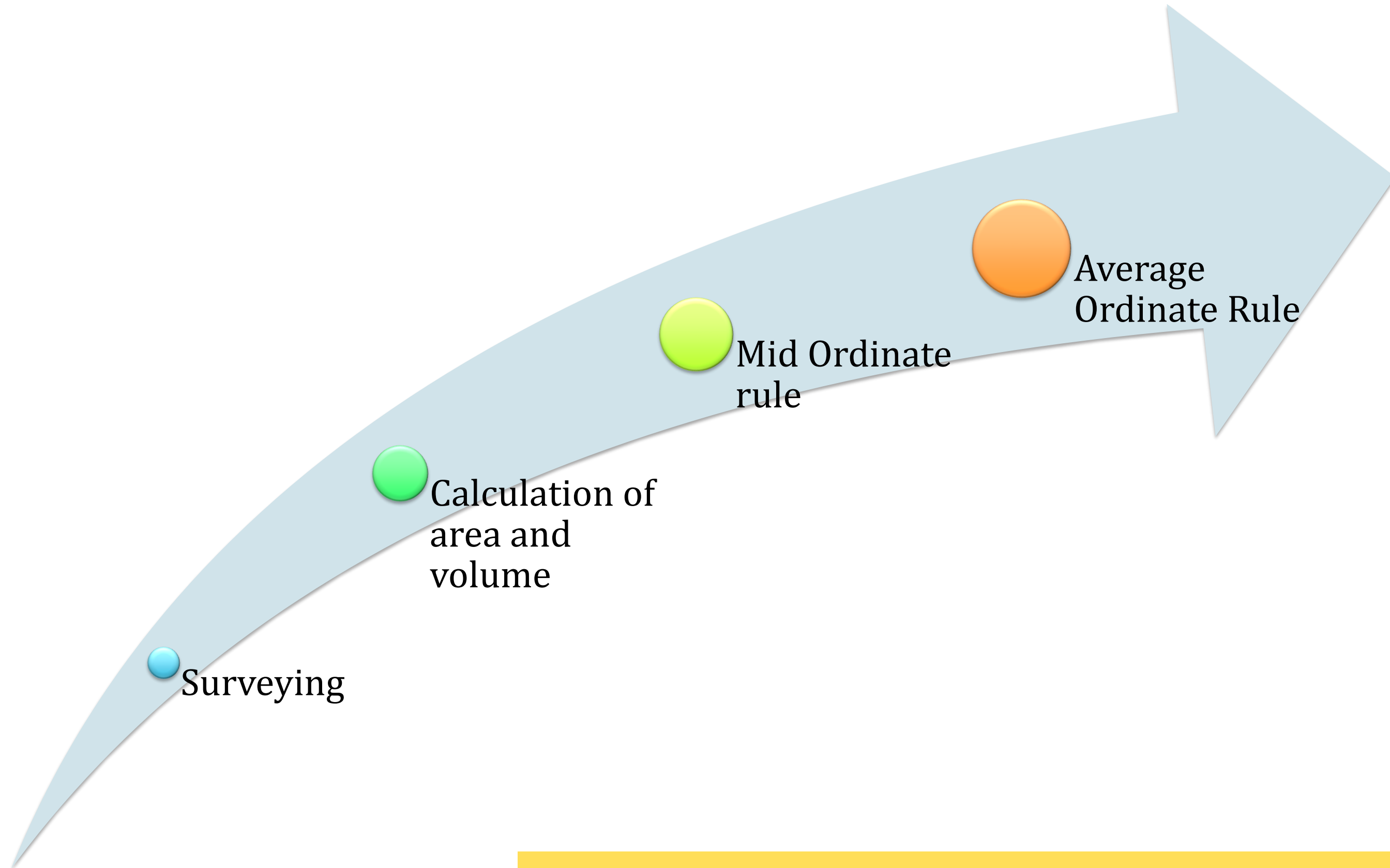
II – YEAR III SEMESTER

UNIT 3 – COMPUTATION OF AREA AND VOLUME

TOPIC 4 – TRAPEZOIDAL RULE



Last Class Review





States!!!

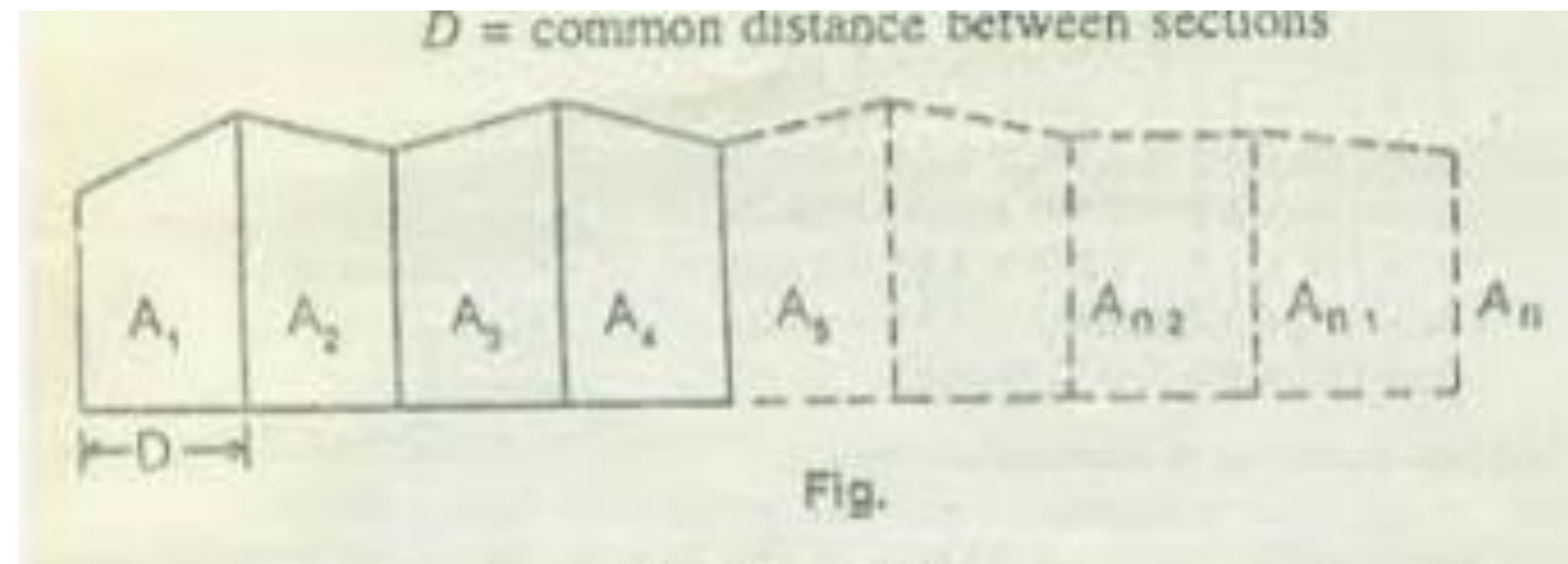
- ❖ To the sum of the first and last ordinate, twice the sum of intermediate ordinates is added. This total sum is multiplied by the common distance. Half of this product is the required area..





Trapezoidal Rule

- ❖ While applying the trapezoidal rule, boundaries between the ends of ordinates are assumed to be straight. Thus the areas enclosed between the base line and the irregular boundary line are considered as trapezoids.





Trapezoidal Rule

- ❖ Let O_1, O_2, \dots, O_n = ordinate at equal intervals,
- ❖ d = common distance between two ordinates





Trapezoidal Rule



$$1^{\text{st}} \text{ area} = \frac{O_1 + O_2}{2} * d$$

$$2^{\text{nd}} \text{ area} = \frac{O_2 + O_3}{2} * d$$

$$3^{\text{rd}} \text{ area} = \frac{O_2 + O_3}{2} * d$$

$$\text{Last area} = \frac{O_{n-1} + O_n}{2} * d$$

$$\text{Total area} = d/2 \{ O_1 + 2O_2 + 2O_3 + \dots + 2O_{n-1} + O_n \}$$



Assessment



- **State Average ordinate rule**





Trapezoidal Rule

$$\text{AREA} = \frac{\text{common distance} ((1^{\text{st}} \text{ ordinate} + \text{last ordinate}) + 2(\text{sum of other ordinates}))}{2}$$





Problem



The following offsets were taken from a chain line to an irregular boundary line at an interval of 10 m:

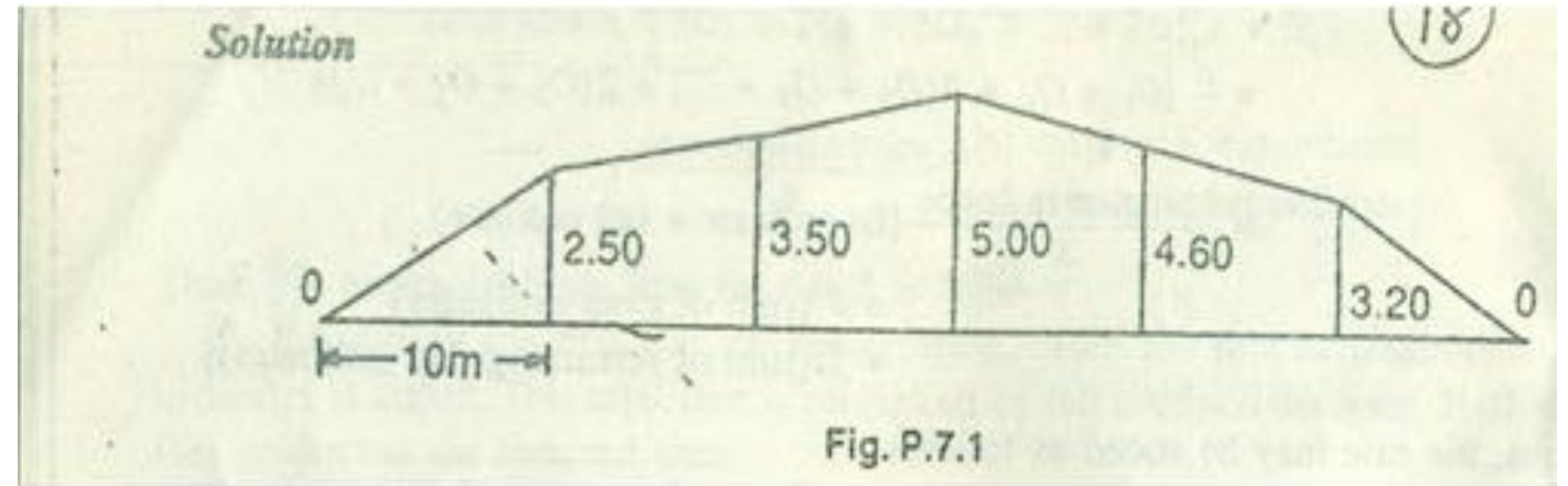
0, 2.50, 3.50, 5.00, 4.60, 3.20, 0 m

Compute the area between the chain line, the irregular boundary line and the end of offsets by:

a) the average –ordinate rule



Problem



Here $d=10\text{m}$

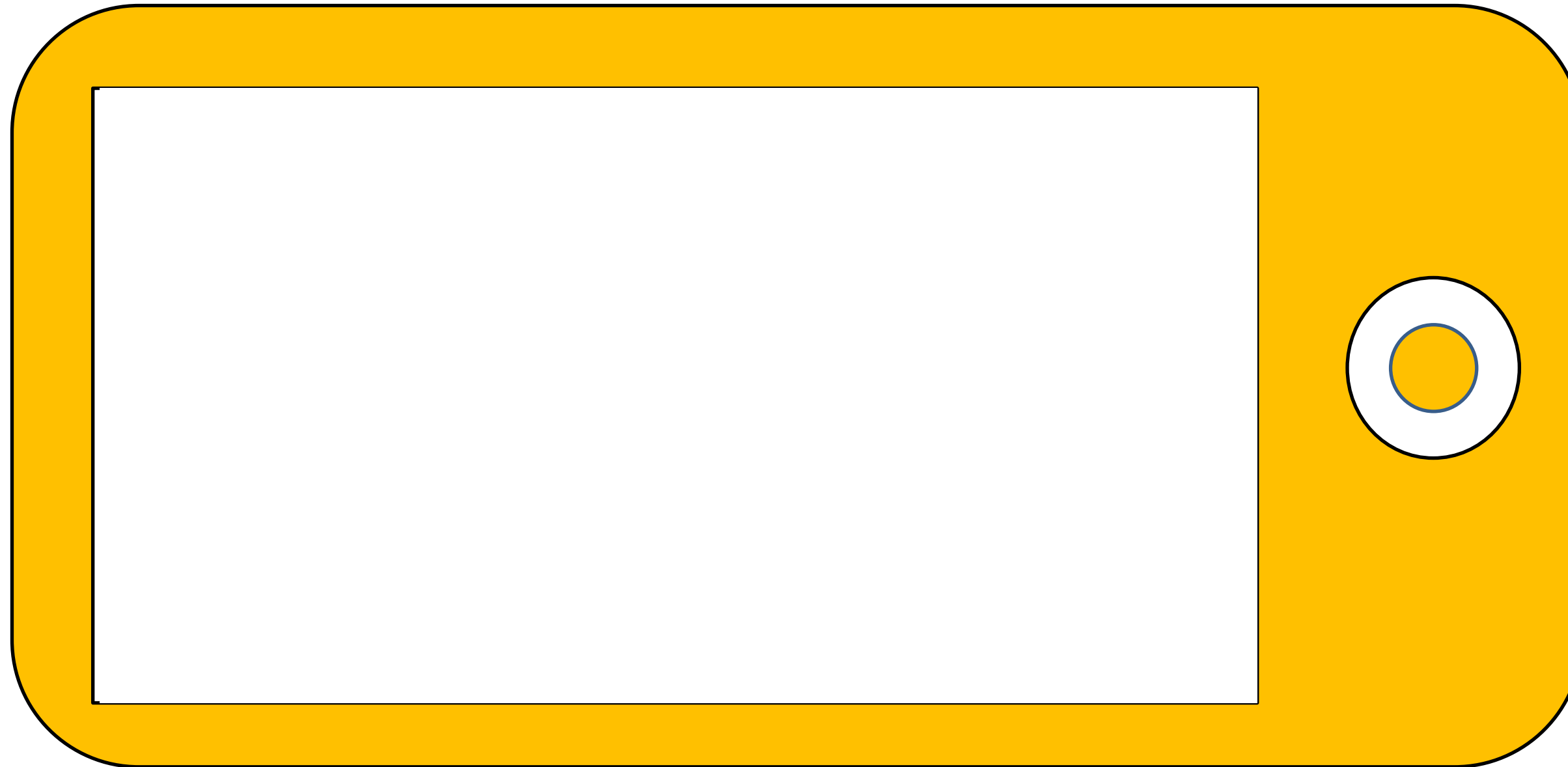
Required area

$$=10/2\{0+0+2(2.50+3.50+5.00+4.60+3.20+)\}$$

$$= 5*37.60=188 \text{ m}^2$$



Reference Videos





See You at Next Class!!!!