SNS COLLEGE OF TECHNOLOGY

An Autonomous Institution
Coimbatore – 35

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Approved by AICTE , New Delhi and Affiliated to Anna University , Chennai.

DEPARTMENT OF AGRICULTURAL ENGINEERING

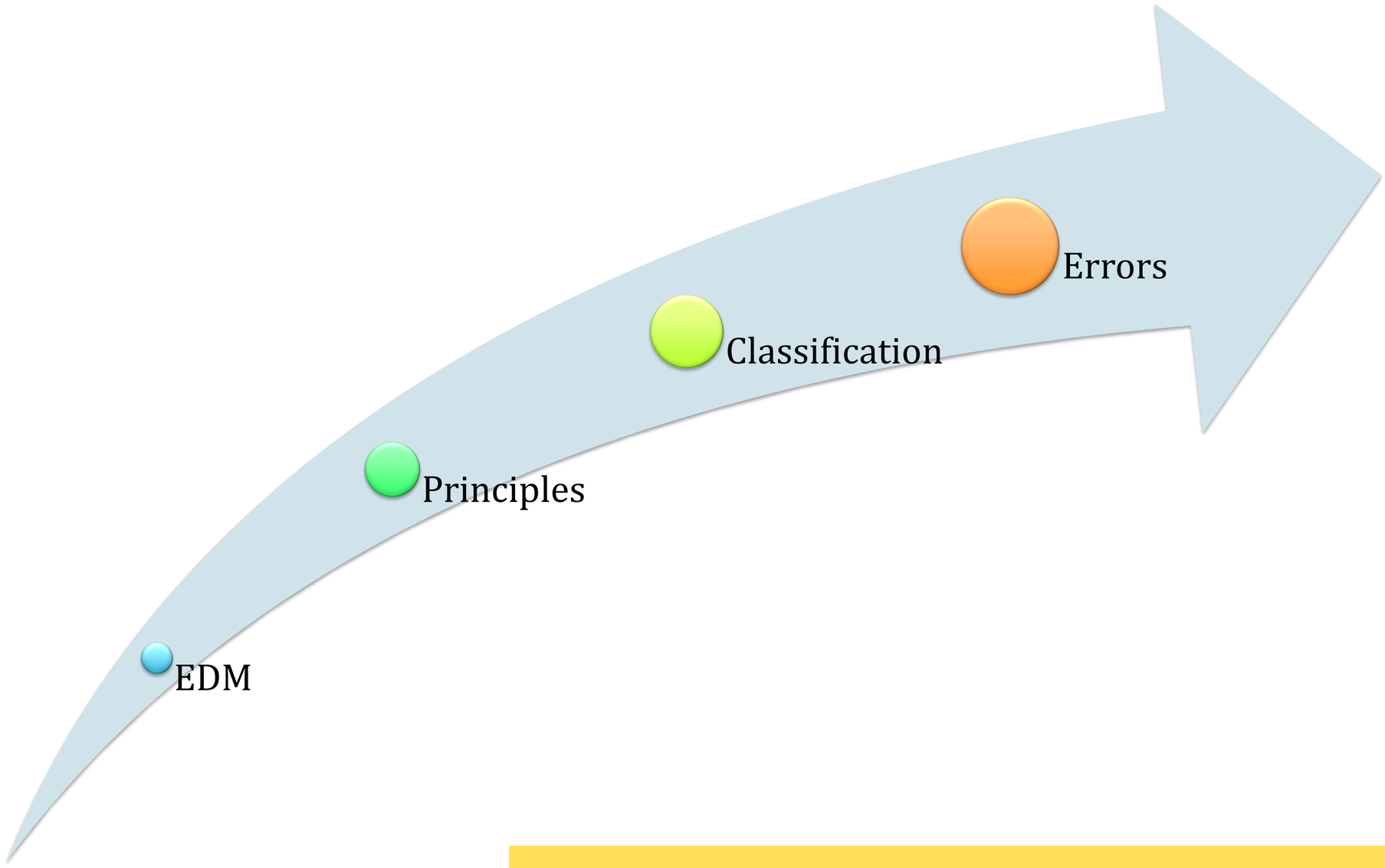
23AGT204 – SURVEYING AND LEVELLING

II – YEAR III SEMESTER

UNIT 3 – LINEAR MEASUREMENT AND COMPUTATION OF AREA, VOLUME

TOPIC 5 – CALCULATION OF AREA

Last Class Review



Introduction

- Generally, the lands will be of irregular shaped polygons.
- There are formulae readily available for regular polygons like, triangle, rectangle, square and other polygons.
- But for determining the areas of irregular polygons, different methods are used.

Methods

- Mid Ordinate method
- Average Ordinate method
- Trapezoidal rule
- Simpson’s rule

Calculation of area is carried out by four methods

Assessment

- **How to test a chain.**
- **Why is it important?**

Mid Ordinate Rule - States!!!

- The rule states that if the sum of all the ordinates taken at midpoints of each division multiplied by the length of the base line having the ordinates (9 divided by number of equal parts)..

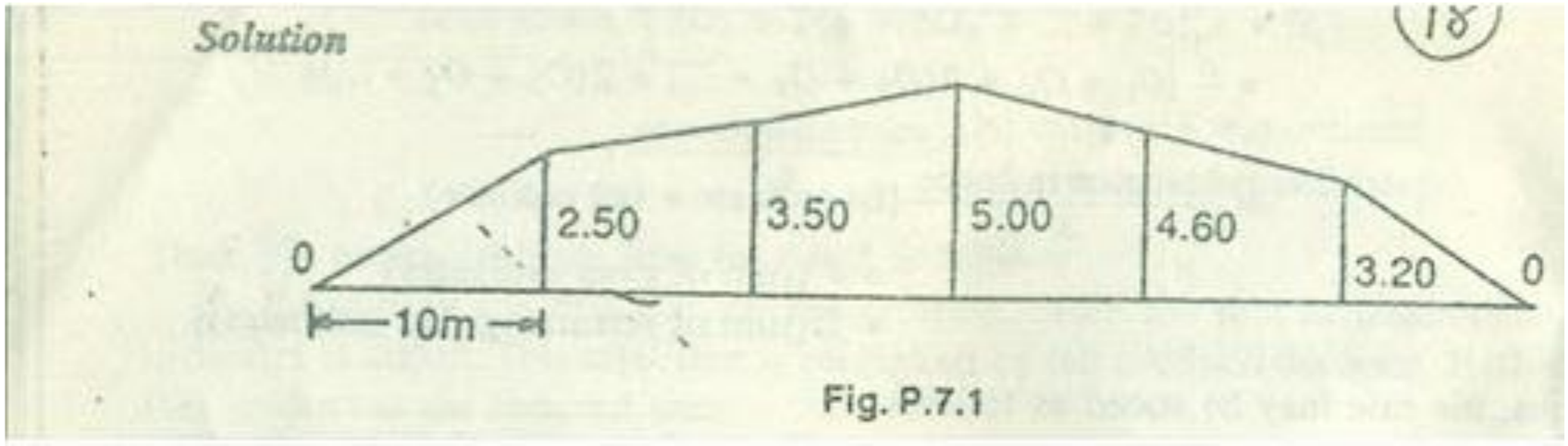


Fig. P.7.1

Mid Ordinate Rule

- Let O1, O2, O3, O4…….On= ordinates at equal intervals
- l=length of base line
- d= common distance between ordinates
- h1,h2,……..hn=mid-ordinates

$$\text{Area of plot} = \frac{h_1*d+h_2*d+\ldots\ldots+h_n*d}{} = d\,(h_1+h_2+\ldots.+h_n)$$

Area = common distance* sum of mid-ordinates

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) mid ordinate rule

Mid-ordinate rule:

Problem

$$h_1 = \frac{0+2.50}{2} = 1.25 \text{ m}$$

$$h_2 = \frac{2.50+3.50}{2} = 3.00 \text{ m}$$

$$h_3 = \frac{3.50+5.00}{2} = 4.25 \text{ m}$$

$$h_4 = \frac{5.00+4.60}{2} = 4.80 \text{ m}$$

$$h_5 = \frac{4.60+3.20}{2} = 3.90 \text{ m}$$

$$h_6 = \frac{3.20+0}{2} = 1.60 \text{ m}$$

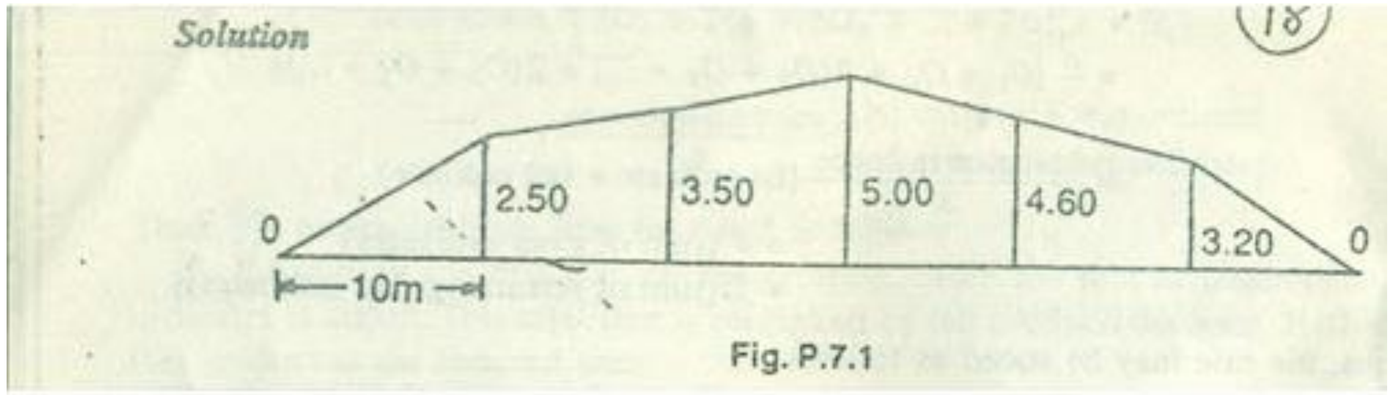


Fig. P.7.1

Required area= 10(1.25+3.00+4.25+3.90+1.60)

= 10*18.80=188 m2

Average Ordinate Rule - States!!!

- The rule states that (to the average of all the ordinates taken at each of the division of equal length multiplies by baseline length divided by number of ordinates).

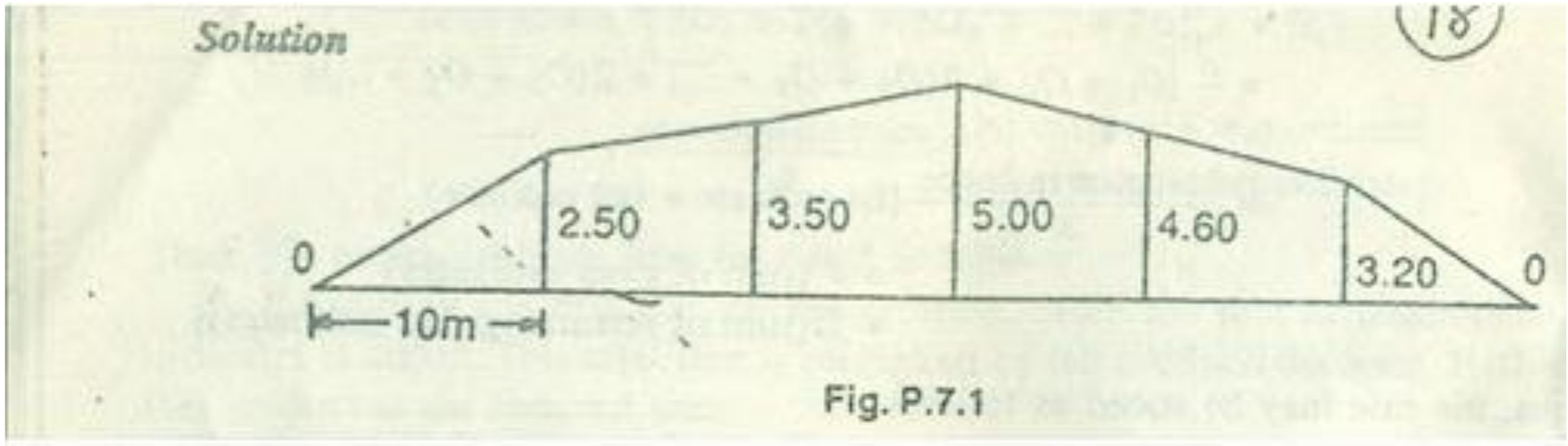


Fig. P.7.1

Average Ordinate Rule

- O1, O2, O3, O4….On ordinate taken at each of division.
- L = length of baseline
- n = number of equal parts (the baseline divided)
- d = common distance

$$\text{Area} = [(O1 + O2 + O3 + \ldots. + On) * L]/(n+1)$$

$$\text{Area} = \frac{\text{sum of the ordinates} * \text{length of base line}}{\text{no of ordinates}}$$

Problem

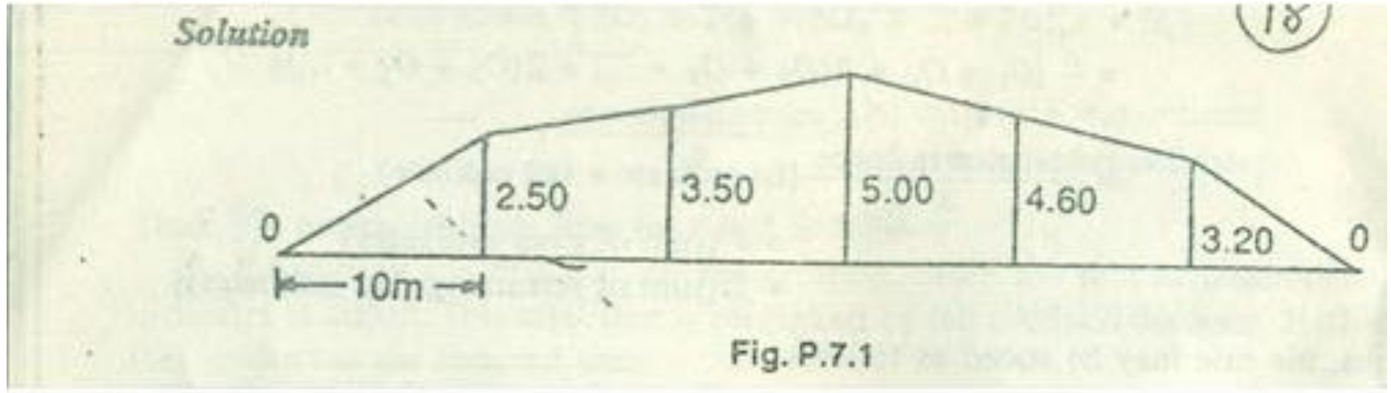
The following offsets were taken from a chain line to an irregular boundary line at an interval of 10 m:

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) Average ordinate rule

Problem



Here d=10 m and n=6(no of devices)

Base length= 10*6=60 m

Number of ordinates= 7

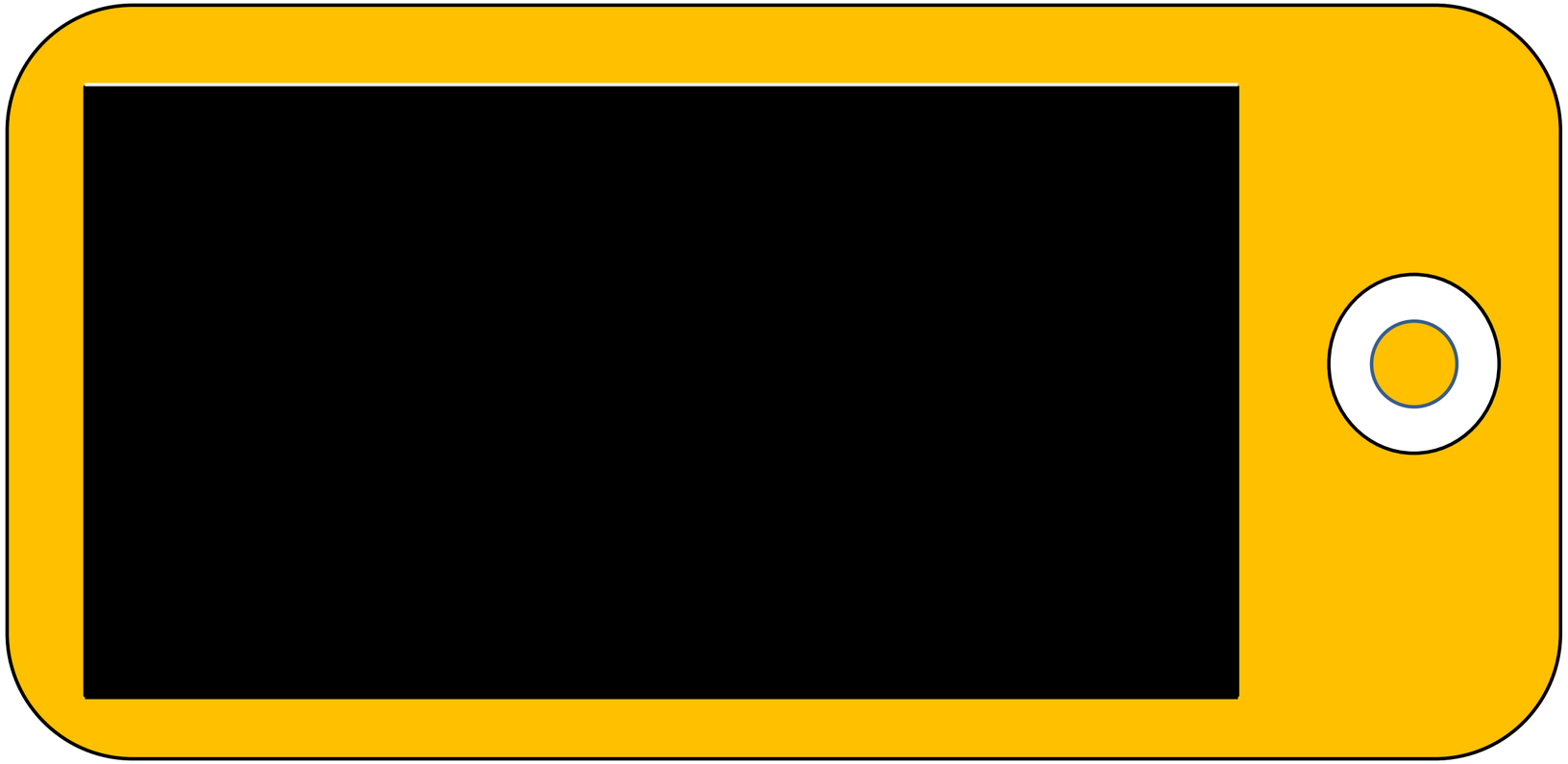
Required area

=60((2.50+3.50+5.00+4.60+3.20+0)/7)

= 60*18.8/7

=161.14m^2

Reference Videos



See You at Next Class!!!!