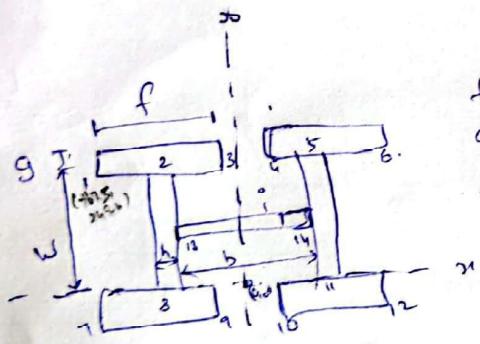


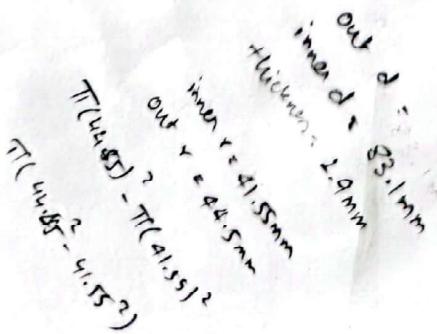
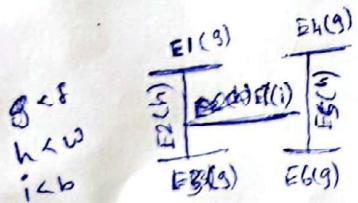
Base class
 Element, Node, Inherit from base
 Profile inherits from Iprofile
 Node inherits from

	Associated Sub Classes			
Base class	Pane	Profile	Spanle	Element
Pane	1			1
Profile		1	1	
Iprofile	-	-	-	-
Element		1		
Node		1		1



I-profile:
 f - length of flange 135 mm
 g - thickness of flange 10.20 mm
 w - height of web = 249.6 mm
 b - length of slab 200 mm
 h - thickness of web 6.6 mm
 i - thickness of slab 8.8 mm

EI



Sanjana's co ordinate system in program.

	x,	y.	
X6	1. $(hu/2) - (tu/2) + hi - ti$	delhi - bi/2	✓
X1	2. $(hu/2) - (tu/2) + hi - bi$	0	✓
X2	3. $(hu/2) - (tu/2)$	$- bi/2$	✓
X3	4. $(hu/2) - (tu/2)$	0	✓
X4	5. $(hu/2) - (tu/2)$	$bi/2$	✓
X5	6. $(hu/2) - (tu/2)$	$bu - su/2 + bi/2$	✗
X6	7. $-((hu/2) - (tu/2))$	delbu - su/2 + bi/2	✗
X7	8. $-((hu/2) - (tu/2))$	$bi/2$	✓
X8	9. $-((hu/2) - (tu/2))$	0	✓
X9	10. $(hu/2) - (tu/2)$	$-bu + su/2 - bi/2$	✓
X10	11. $-((hu/2) - (tu/2))$	$-bu + su/2 - bi/2$	✓
X11	12. $-((hu/2) - (tu/2))$	$- bi/2$	✓
X12	13. $-((hu/2) - (tu/2) + hi - ti)$	$- bi/2$	✓
X13	14. $-((hu/2) - (tu/2) + hi - ti)$	0	✓
X14	15. $-((hu/2) - (tu/2) + hi - ti)$	$bi/2 + di/2 + t/2$	✗
X15	16. $-((hu/2) - (tu/2) + hi - ti)$	$bi/2$	✓
X16	17. $(di/2) + (t/2) - ((hu/2) - (tu/2) + hi - ti)$	$bi/2 + di/2 + t/2$	✗
X17	18. $-((hu/2) - (tu/2) + hi - ti)$	$bi/2 + dit + t/2$	✗
X18	19. $-di/2 - t/2 - ((hu/2) - (tu/2) + hi - ti)$	$bi/2 + di/2 + t/2$	✗
X19	20. $(hu/2) - (tu/2) + hi - bi$	$bi/2 + di/2 + t/2$	✗
X20	21. $(hu/2) - tu/2 + hi - bi$	$bi/2$	✓
X21	22. $di/2 + t/2 + ((hu/2) - tu/2 + hi - ti)$	$bi/2 + di/2 + t/2$	✗
X22	23. $(hu/2) - (tu/2) + hi - ti$	$bi/2 + di + t$	✗
X23	24. $((hu/2) - (tu/2) + hi - ti)$ $- di/2 - t/2 + ((hu/2) - (tu/2) + hi - ti)$	$bi/2 + di/2 + t/2$	✗

Changed coordinate system
considering nodes arbitrarily.

x

y.

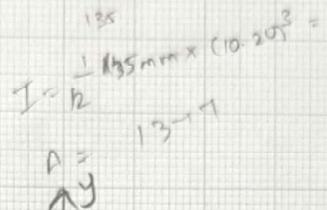
1.	$hu_{1/2} - tu_{1/2} + hi - ti$	$- bi_{1/2}$
2.	$hu_{1/2} + tu_{1/2} + hi - ti$	0
3.	$hu_{1/2} - tu_{1/2}$	$- bi_{1/2}$
4.	$hu_{1/2} - tu_{1/2}$	0
5.	$hu_{1/2} - tu_{1/2}$	$bi_{1/2}$
6.	$hu_{1/2} - tu_{1/2}$	$bi_{1/2} + bu - su_{1/2}$
7.	$-(hu_{1/2} - tu_{1/2})$	$bi_{1/2} + bu - su_{1/2}$
8.	$-(hu_{1/2} - tu_{1/2})$	$bi_{1/2}$
9.	$-(hu_{1/2} - tu_{1/2})$	0
10.	$hu_{1/2} - tu_{1/2}$	$(bi_{1/2} + bu - su_{1/2})$
11.	$-(hu_{1/2} - tu_{1/2})$	$(bi_{1/2} + bu - su_{1/2})$
12.	$-(hu_{1/2} - tu_{1/2})$	$- bi_{1/2}$
13.	$-(hu_{1/2} - tu_{1/2} + hi - ti)$	$- bi_{1/2}$
14.	$-(hu_{1/2} - tu_{1/2} + hi - ti)$	0
15.	$-(hu_{1/2} - tu_{1/2} + hi - ti)$	$bi_{1/2} + t + di_{1/2}$
16.	$-(hu_{1/2} + tu_{1/2} + hi - ti)$	$bi_{1/2}$
17.	$-(hu_{1/2} + tu_{1/2} + hi - ti) + di_{1/2}$	$bi_{1/2} + di_{1/2} + t$
18.	$-(hu_{1/2} + tu_{1/2} + hi - ti)$	$bi_{1/2} + di + \frac{3t}{2}$
19.	$-(hu_{1/2} + tu_{1/2} + hi - ti) - di_{1/2}$	$bi_{1/2} + di_{1/2} + t$
20.	$(hu_{1/2} - tu_{1/2} + hi - ti)$	$bi_{1/2} + t + di_{1/2}$
21.	$(hu_{1/2} - tu_{1/2} + hi - ti)$	$bi_{1/2}$
22.	$(hu_{1/2} - tu_{1/2} + hi - ti) - di_{1/2}$	$bi_{1/2} + t + di_{1/2}$
23.	$(hu_{1/2} - tu_{1/2} + hi - ti)$	$bi_{1/2} + di + \frac{3t}{2}$
24.	$(hu_{1/2} - tu_{1/2} + hi - ti) + di_{1/2}$	$bi_{1/2} + t + di_{1/2}$

inner
node

inner
node

$$\begin{aligned}
 2454 + 1647.36 &= 4001.36 \times 2 = 8802.72 \\
 200 \times 8 &= 1600 = 1600.00 \\
 &\hline
 &10402.72
 \end{aligned}$$

Shear moment S-x with y coordinate
Sy-units 2000 N/mm



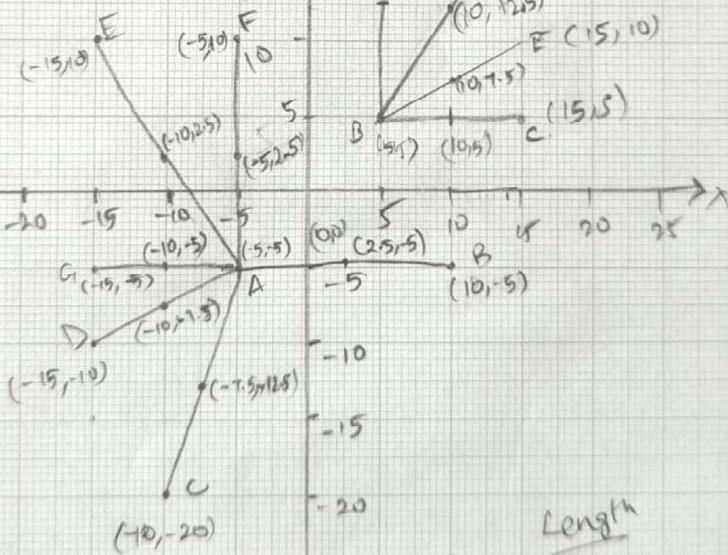
$$I = \frac{\pi}{6} (d_0^4 - d_1^4)$$

$$A = \frac{\pi}{4} (d_0^2 - d_1^2)$$

$$I_{xx} = \frac{(y^2)}{12} + (y^2) \times A$$

$$I_{yy} = \frac{(x^2) + x^2}{12} \times A$$

$$\frac{L(y)^2}{12} + (y^2)A$$



$$\begin{aligned}
 S_{437} &= 3.437 \\
 S_{056} &= 2.056 \\
 S_{000} &= 0.000 \\
 S_{437} &= 3.437 \\
 S_{056} &= 2.056 \\
 S_{000} &= 0.000 \\
 S_{662} &= 2.662 \\
 &\hline
 S_{642} &= 2.642 \times 10^5 \text{ mm}^2
 \end{aligned}$$

Centre

$$\text{Centre}(AC) \rightarrow \frac{15+5}{2}, \frac{5+5}{2} = 10, 5$$

$$\text{Centre}(AB) \rightarrow \frac{5+15}{2}, \frac{5+10}{2} = 10, 12.5$$

$$\text{Centre}(B) \rightarrow \frac{5+5}{2}, \frac{5+10}{2} = 5, 12.5$$

$$\text{Centre}(BE) \rightarrow \frac{5+15}{2}, \frac{5+10}{2}, 10, 7.5$$

Length

$$\text{Length}(AB) = 10 \text{ units}$$

$$\text{Length}(BC) = 10 \text{ units}$$

$$\text{Length}(BD) = 15 \text{ units}$$

$$\text{Length} BE \Rightarrow 5 \text{ units}$$

actual Length

13.027 units.

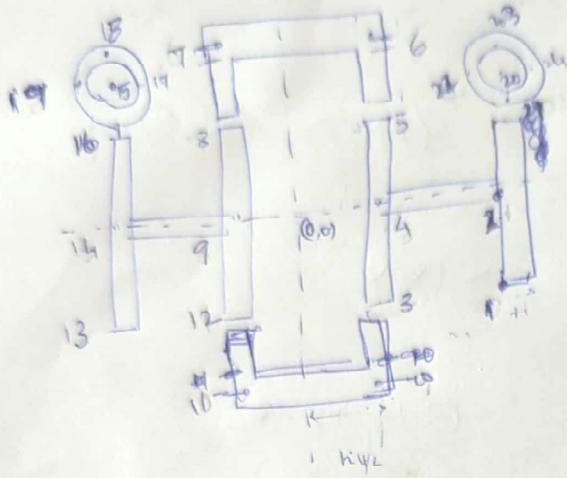
10 units.

15 units.

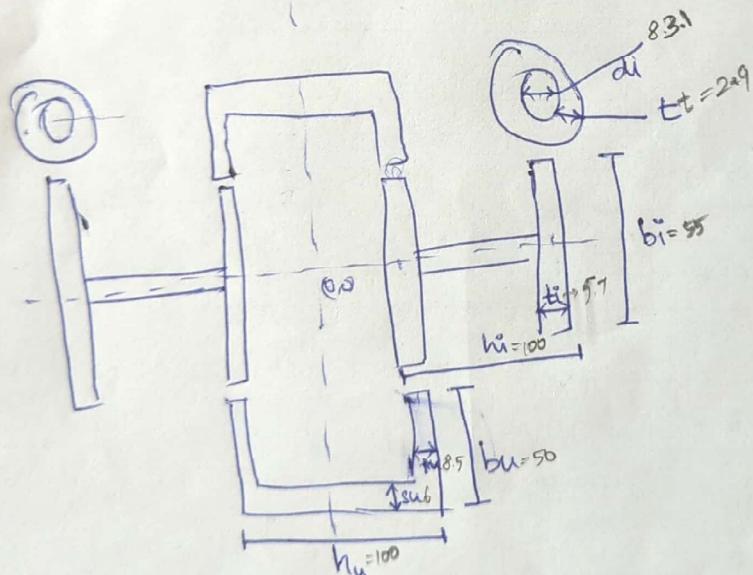
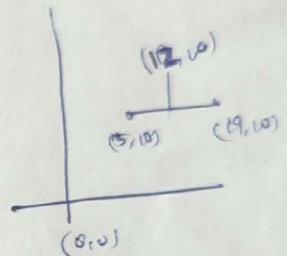
11.08 units.

VTJSUF

NV + CONDUIT = 10
 P 2 + OUTLET = 16
 d 3 + INLET = 10
 d 4 + OUTLET = 14
 d 5 + INLET = 12

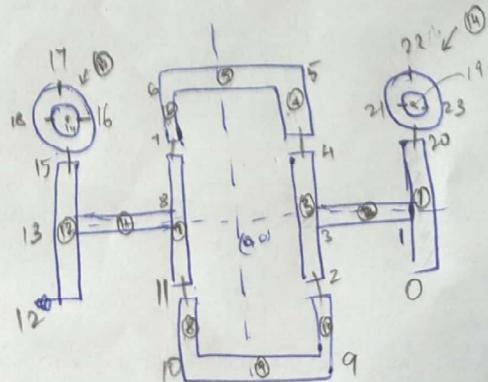


$$len = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$



0,20 - E1, ti
 1,3 - E2, ti
 2,4 - E3, ti
 4,5 - E4, tu
 5,6 - E5, su
 6,7 - E6, tu
 7,11 - E7, ti
 10,11 - E8, tu
 9,10 - E9, su
 2,9 - E10, tu

8,13 - E11, ti
 12,15 - E12, ti
 14,15,16,17,18 - E13, tt
 19,20,21,22,23 - E14, tt



$$A_1 = 10 \cdot 3$$

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1

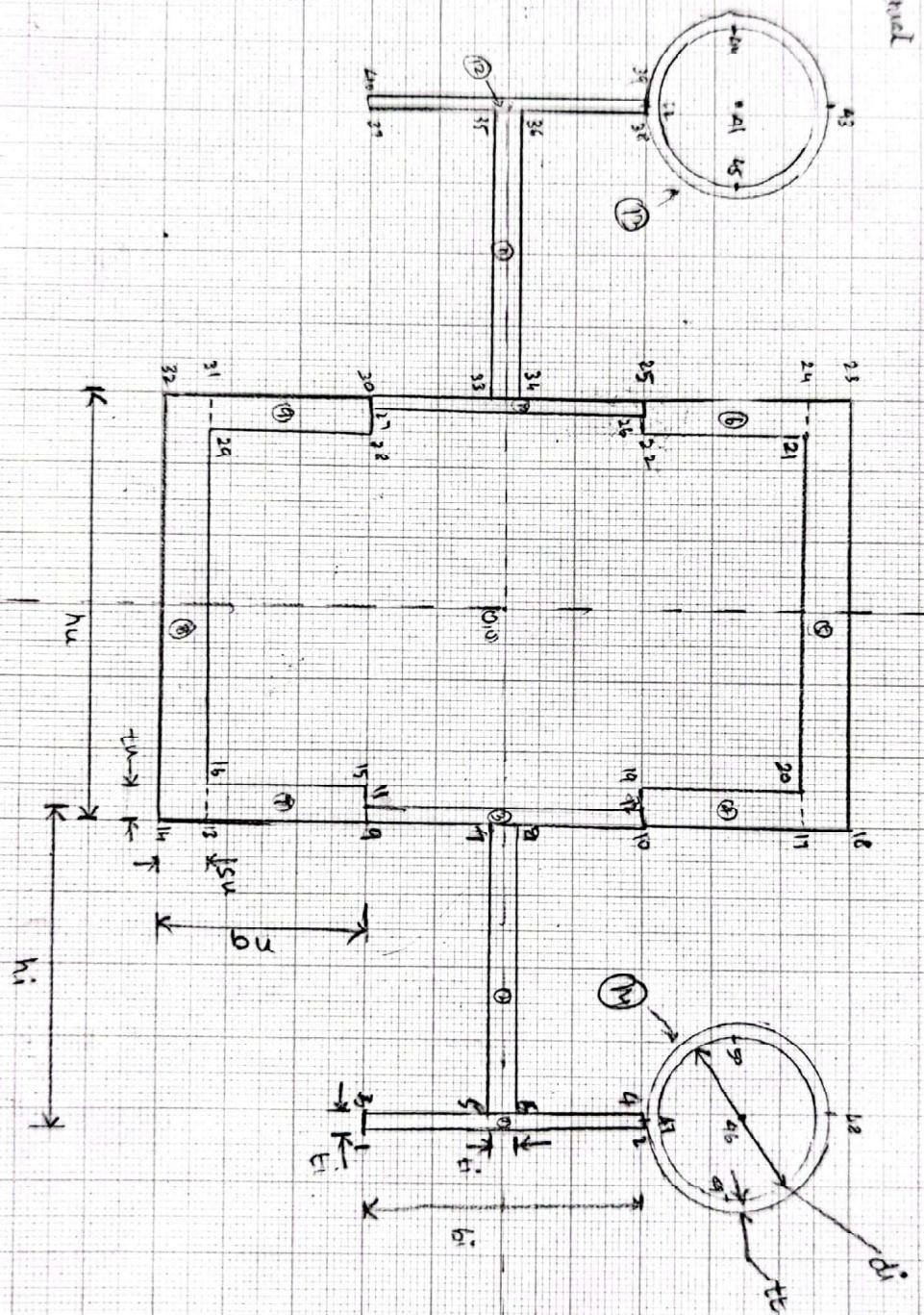
31.66 x 2

63.28 m² - Actual

Catwalked by John

6527.68m

$$S_{\text{outer}} = 657.0 \text{ mm}^2$$



$$AB \Rightarrow \left(\frac{+5+10}{2} \right), \left(-\frac{5+(-5)}{2} \right) = (2.5, -5)$$

Length		Actual length
x	$\frac{4}{15}$	4
$L(AP) = 10 - (-5)$	$= 15$	$= 5 - (-5)$
		$= 0$

$$AC = \left(\frac{-5+(-10)}{2} \right), \left(\frac{5+(-2.5)}{2} \right) = (-7.5, 1.25)$$

$L(AC) = -10 - (-5)$	$= -5 - (-2.5)$
$= -10 + 5$	$= -5 + 2.5$
$= -5$	$= -1.5$

$$AD = \left(\frac{-5+(-10)}{2} \right), \left(\frac{-5+10}{2} \right) = (-10, -1.5)$$

$L(AD) = -10 - (-5)$	$= -10 - (-1.5)$
$= -10 + 5$	$= -10 + 1.5$
$= -5$	$= -8.5$

$$AE = \left(\frac{-5+(-5)}{2} \right), \left(\frac{-5+10}{2} \right) = (-10, 2.5)$$

$L(AE) = -10 - (-5)$	$= -10 - (-5)$
$= -10 + 5$	$= -10 + 5$
$= -5$	$= -5$

$$AF = \left(\frac{-5+(-5)}{2} \right), \left(\frac{-5+10}{2} \right) = (-5, 2.5)$$

$L(AF) =$	$= -$
-----------	-------

$$AG = \left(\frac{-5+(-10)}{2} \right), \left(\frac{-5+(-5)}{2} \right) = (-10, -5)$$

$L(AG) =$	$= -$
-----------	-------

$$I_{xy} = A(Lx \cdot Ly/2 + p(x)p(y))$$

$$J = I_x + AH^2$$

$$= \frac{bh^3}{12} + bh \cdot \left(\frac{h}{2}\right)^2$$

$$= \frac{bh^3}{12} + bh \cdot \frac{h^2}{4}$$

$$= \frac{bh^3}{12} + \frac{bh^3}{4}$$

$$= \frac{bh^3}{12} + \frac{3bh^3}{12}$$

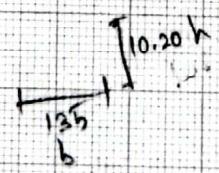
$$= \frac{4bh^3}{12}$$

$$= \frac{10.2 \times (135)^3}{31}$$

$$I_x = \frac{bh^3}{12}$$

$$A = bh$$

$$H = h/2$$



$$I_{xx} = 8.579 \times 10^8 \text{ mm}^4$$

$$I_{yy} = 1.586 \times 10^7 \text{ mm}^4$$

$$(103, 249.6)$$

$$(161.5, 249.6)$$

$$dt = 10.20$$

$$\text{Length: } 135 \text{ mm} \times 10^{-3}$$

$$\sqrt{(135 \times 10^{-3})^2 + (10.20)^2} = 135$$

$$A = L \times dt = 135 \times 10^{-3} \times 10.20 = 13.77 \text{ mm}^2$$

$$\text{Static moment } x = 219.6 \times 13.77 = 3436.912$$

$$\text{Static moment } y = -100 \times 13.77 = -1377.000$$

$$I_{xx} = 47754.36$$

$$I_{yy} = 8365275.0$$

$$\frac{5h}{3}, \frac{h}{3}, \frac{5h}{3}$$

$$A \cdot \frac{h^2}{12} + A \left(\frac{h^2}{4} \right)$$

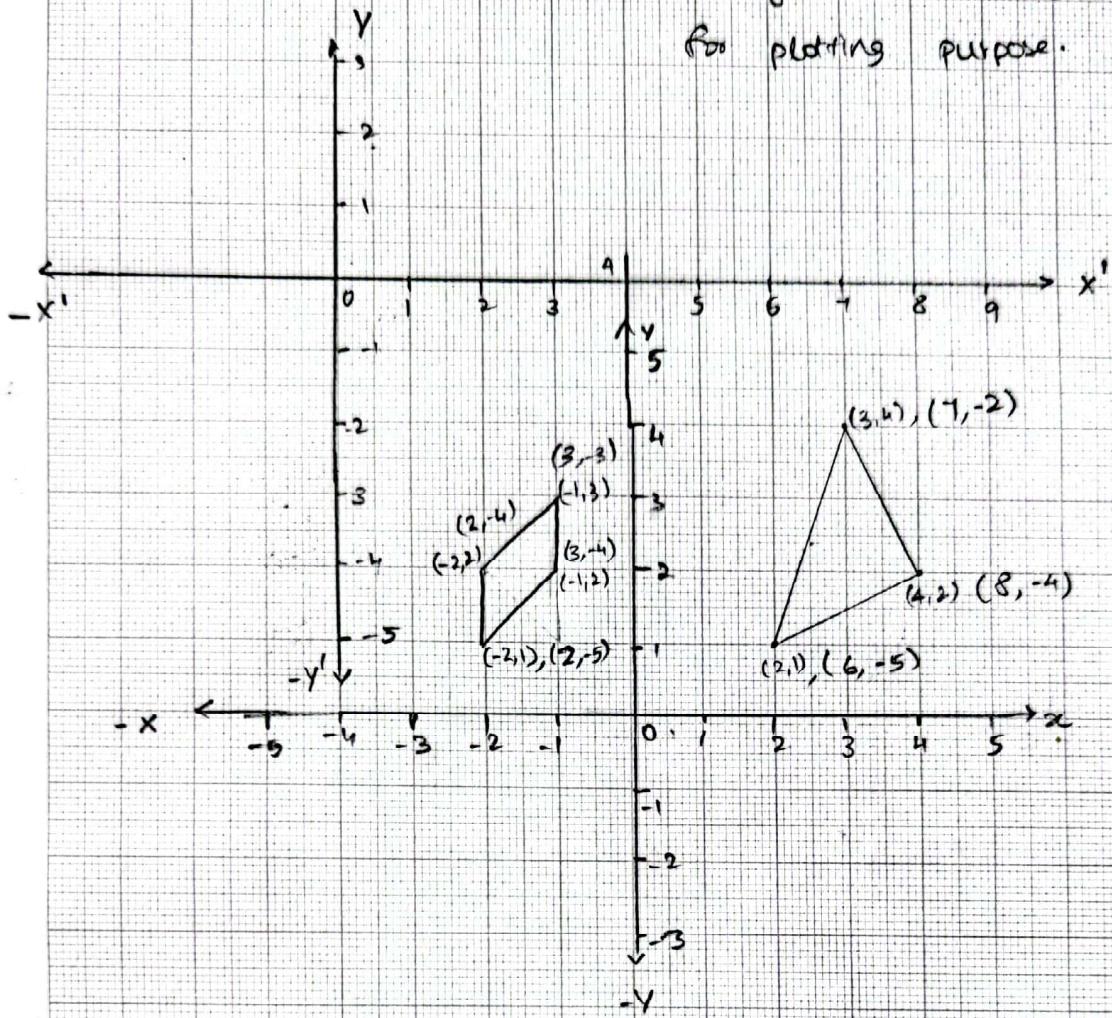
$$A \left(\frac{h^2}{12} + \frac{h^2}{4} \right)$$

$$(0 + (249.6)^2) \cdot 1377 = 8.512$$

$$\cdot \left(\frac{135^2 \times (-100)^2}{12} \right) \cdot 1377 = 1586$$

Coordinate system transformation

for plotting purpose.

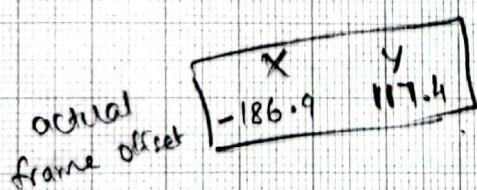


original coordinate system XY $x \text{ len}(-4)$ $y \text{ len}(6)$

offset $(x', y') = (4, -6)$ add to points.



for program:



add
 $\rightarrow 186.9$ to x - coordinate
 $\rightarrow -117.4$ to y - coordinate

offset x
 $0.5hu - ti + hi - 0.5ti + 0.5di + t + 1$

Offset Y:
 $orbit_t + t + di + 1$