

## ERRATA

Ch 2 2a-i - #3 – Switched i and j.

Ch 2 2c #1 – Above correction.

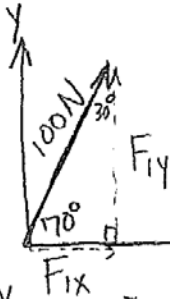
Ch 3b-i #1 – Point E is 1m from both the x and z axes. The vertical length from A to E is 0.5 m.

Ch 5 #2 – Math error.

Ch 6 #1a – Typographical addition error.

Ch 6 #2 – Correction from Ch 5 #2. Minor xbar label change.

# Ch 2 2a-i.

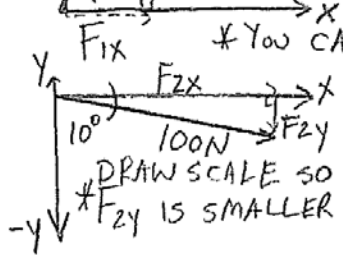


$$\sin 70^\circ = \frac{F_{1y}}{100N} \Rightarrow F_{1y} = 100N \sin 70^\circ = 93.97N$$

$$\cos 70^\circ = \frac{F_{1x}}{100N} \Rightarrow F_{1x} = 100N \cos 70^\circ = 34.20N$$

$$\vec{F}_1 = +34.20\hat{i} + 93.97\hat{j} \text{ N}$$

Check:  $\sqrt{34.2^2 + 93.97^2} = 100V$



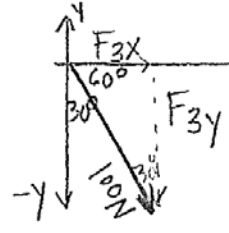
\* You CAN USE  $\sin 30^\circ$  TO GET  $F_{1x}$  ALTERNATIVELY.

$$\sin 10^\circ = \frac{F_{2y}}{100N} \Rightarrow F_{2y} = 100N \sin 10^\circ = 17.36N$$

$$\cos 10^\circ = \frac{F_{2x}}{100N} \Rightarrow F_{2x} = 100N \cos 10^\circ = 98.48N$$

$$\vec{F}_2 = +98.48\hat{i} - 17.36\hat{j} \text{ N}$$

(RIGHT) (DOWN)



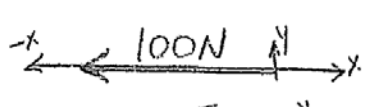
\* USE EITHER  $10^\circ$  OR  $30^\circ$  TO X-AXIS OR Y-AXIS

$$\sin 60^\circ = \frac{F_{3y}}{100N} \Rightarrow F_{3y} = 100 \sin 60^\circ = 86.60N$$

$$\cos 60^\circ = \frac{F_{3x}}{100N} \Rightarrow F_{3x} = 100 \cos 60^\circ = 50N$$

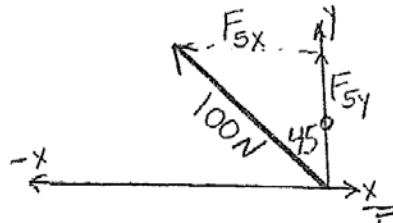
$$\vec{F}_3 = +50\hat{i} - 86.60\hat{j} \text{ N}$$

(RIGHT) (DOWN)



(NO Y COMPONENT TO THE LEFT)

$$\vec{F}_4 = -100\hat{i} + 0\hat{j} \text{ N}$$



$$\sin 45^\circ = \frac{F_{5x}}{100N} \Rightarrow F_{5x} = 100 \sin 45^\circ = 70.71N$$

$$\cos 45^\circ = \frac{F_{5y}}{100N} \Rightarrow F_{5y} = 100 \cos 45^\circ = 70.71N$$

$$\vec{F}_5 = -70.71\hat{i} + 70.71\hat{j} \text{ N}$$

(LEFT) (UP)

2c

1.

Vector	X-component (N)	Y-component (N)
F <sub>1</sub>	+ 34.20	+ 93.97
F <sub>2</sub>	+ 98.48	- 17.36
F <sub>3</sub>	+ 50	- 86.60
F <sub>4</sub>	- 100	0
F <sub>5</sub>	- 70.71	+ 70.71

$$\sum F_x = +11.97 \text{ N} \quad \sum F_y = +60.72 \text{ N}$$

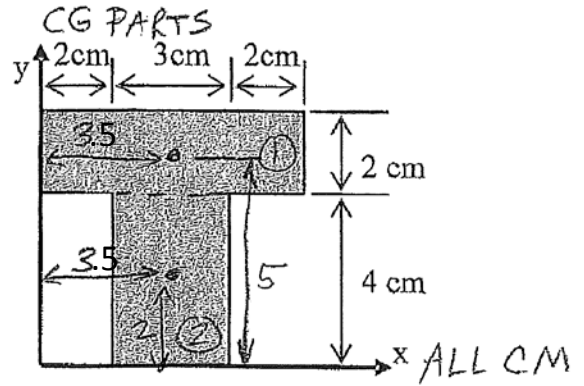
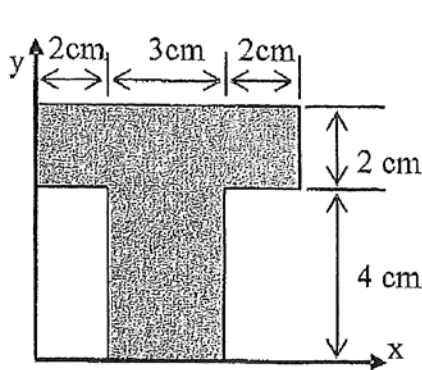
$$|\vec{R}| = \sqrt{(11.97)^2 + (60.72)^2} = 61.89 \text{ N}$$

$$\tan \theta = R_y / R_x = 5.073 \quad \Rightarrow \theta = \tan^{-1} 5 = 78.8^\circ$$

$$\vec{R} = +11.97 \text{ i} + 60.72 \text{ j N}$$

$$\vec{R} = 61.89 \text{ N} \quad \nearrow 78.8^\circ$$

Ch 52



MINIMUM NUMBER  
IS 2 RECTANGLES

Part	A (cm <sup>2</sup> )	From y axis		From x axis	
		x (cm)	Ax (cm <sup>3</sup> )	y (cm)	Ay (cm <sup>3</sup> )
1	(2)(7) = 14	3.5	49	5	70
2	(3)(4) = 12	3.5	42	2	24

Totals  $\Sigma A = 26 \text{ cm}^2$      $\Sigma Ax = 91 \text{ cm}^3$      $\Sigma Ay = 94 \text{ cm}^3$

$$\bar{x} = \frac{\Sigma Ax}{\Sigma A} = \frac{91 \text{ cm}^3}{26 \text{ cm}^2} = 3.5 \text{ cm}$$

$$\bar{y} = \frac{\Sigma Ay}{\Sigma A} = \frac{94 \text{ cm}^3}{26 \text{ cm}^2} = 3.615 \text{ cm}$$

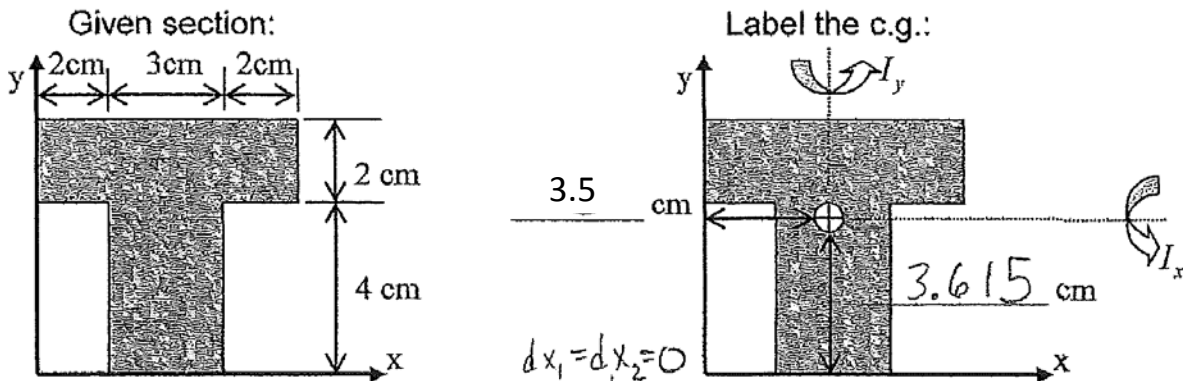
MAKE SENSE?    SYMMETRIC ✓    IN PIECE ② ✓

Ch 6 1

$$(a) \bar{I}_x = \frac{bh^3}{9 \cdot 2 + 3} = bh^3 / 21$$

$$\bar{I}_y = \frac{hb^3}{2 + 3} = hb^3 / 5$$

# Ch 6 2

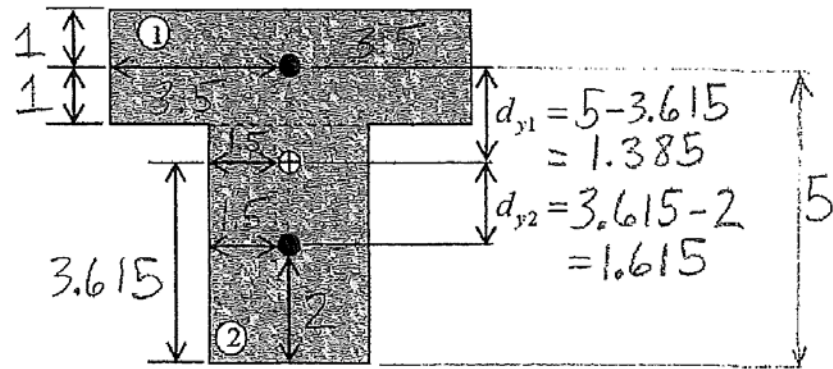


TABLE

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

$$I_y = \frac{b^3h}{12}$$

ALL CM



Part	$\bar{I}_x$ about own cg	A (cm <sup>2</sup> )	cg part to cg all	REMEMBER SQUARED $Ad_y^2$ (cm <sup>4</sup> )	$\bar{I}_y$ about own cg	(repeat)	cg part to cg all	$Ad_x^2$ (cm <sup>4</sup> )
1	$\frac{(7)(2)^3}{12}$	(2)(7)	1.385	26.855	$\frac{(2)(7)^3}{12}$	(2)(7)	0	0
2	$\frac{(3)(4)^3}{12}$	(3)(4)	1.615	31.299	$\frac{(4)(3)^3}{12}$	(3)(4)	0	0

Totals  $\sum \bar{I}_x = 4.67 + 16 = 20.667 \text{ cm}^4$      $\sum Ad_y^2 = 58.154 \text{ cm}^4$      $\sum \bar{I}_y = 57.17 + 9 = 66.167 \text{ cm}^4$      $\sum Ad_x^2 = 0$

$$I_x = \sum \bar{I}_x + \sum Ad_y^2 = 20.667 + 58.154 = \underline{78.821 \text{ cm}^4}$$

$$I_y = \sum \bar{I}_y + \sum Ad_x^2 = 66.167 + 0 = \underline{66.167 \text{ cm}^4}$$