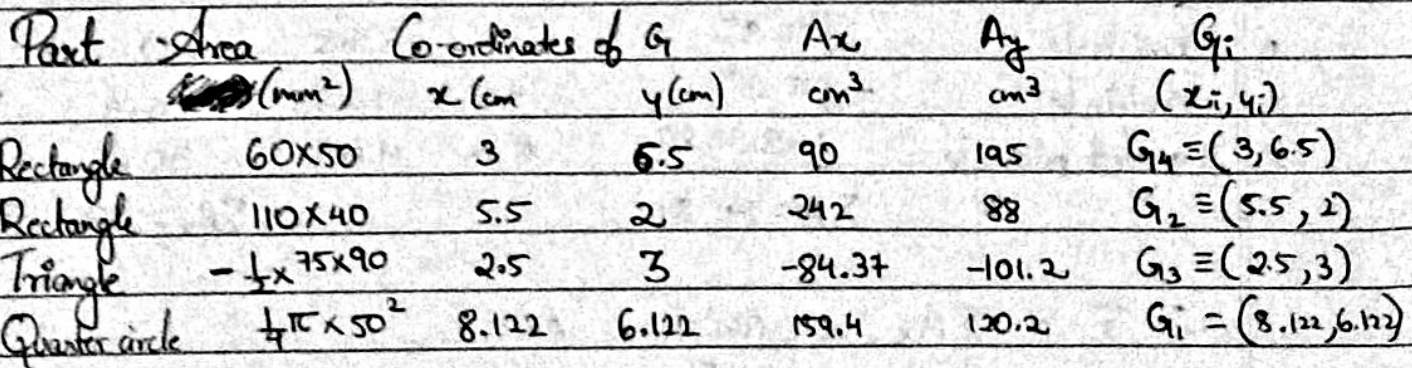


1) Determine the centre of gravity of the shaded area.

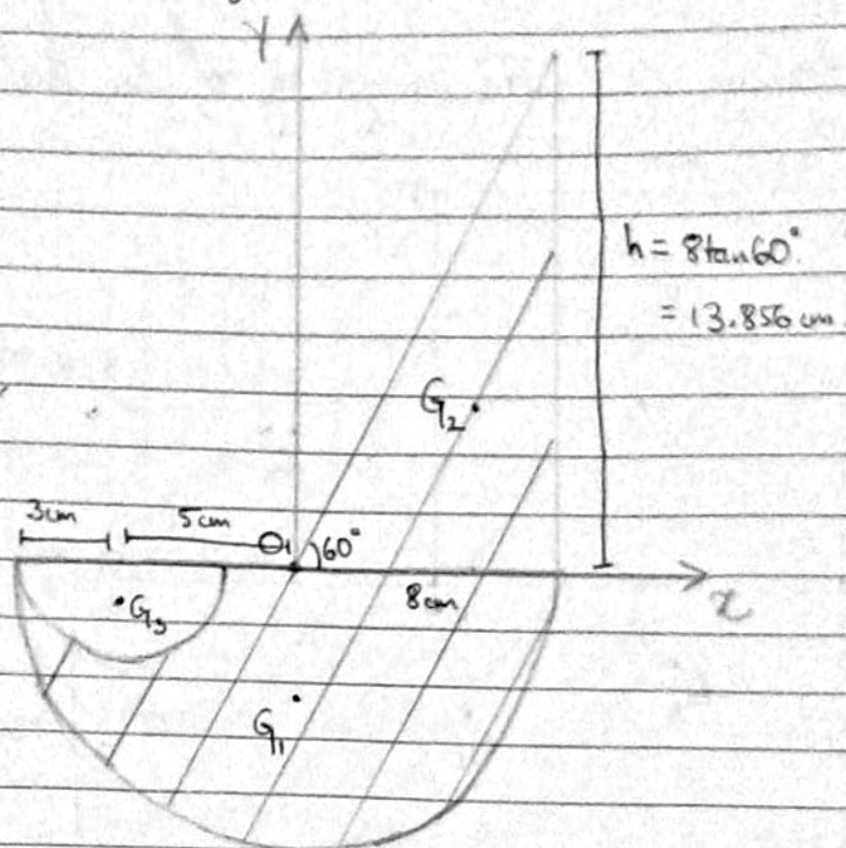


$$\bar{y} = \frac{\sum A_y}{\sum A} = \frac{302}{59.88} = 5.043 \text{ cm.}$$

$\therefore$  Centre of gravity of the body  $G \equiv (6.797, 5.043)$ .



2) Determine the centroid of the shaded portion.



Part	Area ( $\text{cm}^2$ )	Coordinates		$A_x$ ( $\text{cm}^3$ )	$A_y$ ( $\text{cm}^3$ )
		x	y		
1) Semicircle	$\frac{1}{2} \pi 8^2$	0	-3.395	0	-341.3
2) Semicircle	$-\frac{1}{2} \pi 3^2$	-5	-1.273	295.4	256
3) L angled triangle	$\frac{1}{2} \times 8 \times 13.856$	5.33	4.619	70.68	18
	$\Sigma A = 141.81$			$\Sigma A_x = 366$	$\Sigma A_y = -67.33$

$$\therefore \bar{x} = \frac{\Sigma A_x}{\Sigma A} = \frac{366}{141.81} = 2.581 \text{ cm}$$

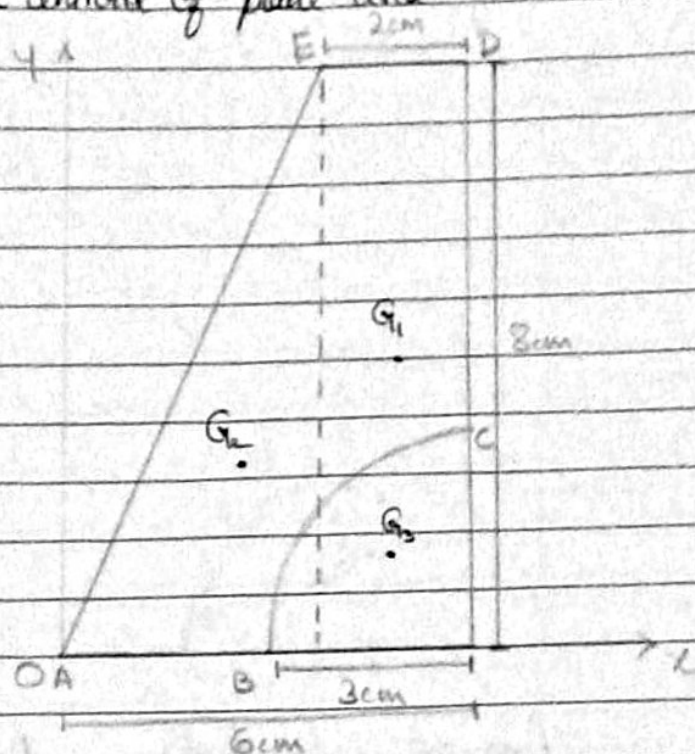
$$\bar{y} = \frac{\Sigma A_y}{\Sigma A} = \frac{-67.33}{141.81} = -0.474 \text{ cm}$$

$\therefore$  Centroid of given body  $G \equiv (2.581, -0.474)$





- 9) Determine the centroid of plane area ABCDE w.r.t A.



	Part	Area $\text{cm}^2$	Coordinates $(x, y)$	$Ax$	$Ay$
1)	Rectangle	$2 \times 8$	$(5, 4)$	80	64
2)	Rt. angled triangle	$\frac{1}{2} \times 4 \times 8$	$(2.667, 2.667)$	42.67	42.67
3)	Quarter Circle	$-\frac{1}{4} \pi 3^2$	$(4.727, 1.273)$	-33.41	-9

$$\Sigma A = 24.932$$

$$\Sigma Ax = 89.26 \quad \Sigma Ay = 97.67$$

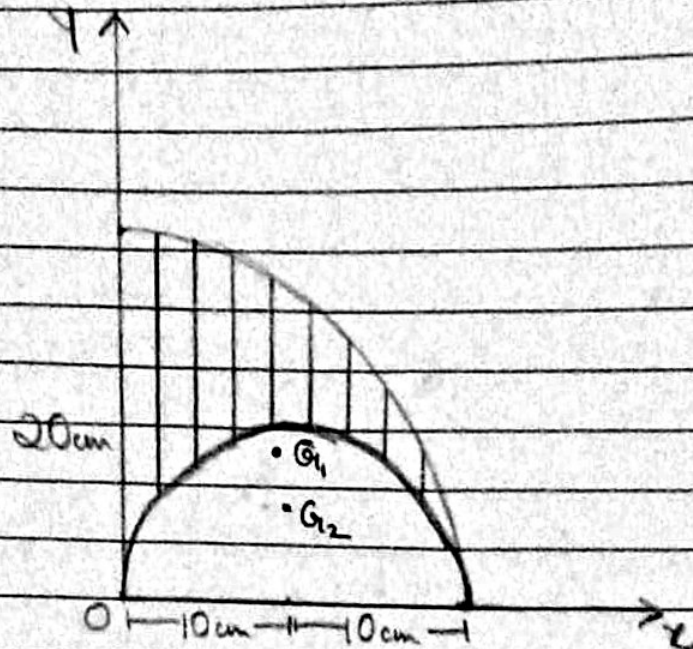
$$\therefore \bar{x} = \frac{\Sigma Ax}{\Sigma A} = \frac{89.26}{24.932} = 3.58 \text{ cm.}$$

$$\bar{y} = \frac{\Sigma Ay}{\Sigma A} = \frac{97.67}{24.932} = 3.917 \text{ cm.}$$

$$\therefore \text{Centroid } G \equiv (3.58, 3.917) \text{ cm}$$



- 1) Find the centroid of shaded region.



Part	Area $\text{cm}^2$	Coordinates $x$ $y$		$Ax$	$Ay$
1) Quarter circle	$\frac{1}{4} \pi 20^2$	8.488	8.488	2666.6	2666.6
2) Semi circle	$-\frac{1}{2} \pi 10^2$	10	4.244	-1570.5	-666.6

$$\Sigma A = 157.08$$

$$\Sigma Ax = 1095.8 \quad \Sigma Ay = 2000$$

$$\bar{x} = \frac{\Sigma Ax}{\Sigma A} = \frac{1095.8}{157.08} = 6.9786 \text{ cm}$$

$$\bar{y} = \frac{\Sigma Ay}{\Sigma A} = \frac{2000}{157.08} = 12.73 \text{ cm}$$

$$\therefore \text{Centroid } G \equiv (6.976, 12.730) \text{ cm}$$