

# MECÂNICA GERAL

## Centro de Gravidade

Prof.<sup>a</sup> Andressa Angelin

Aula 5

03/10/20

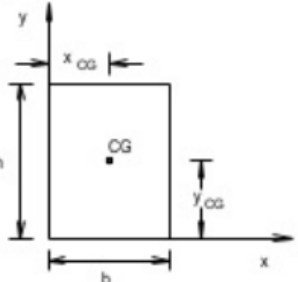
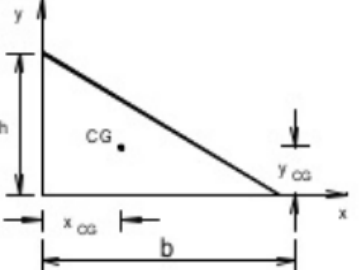
# Centro de Gravidade

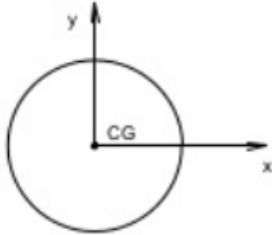
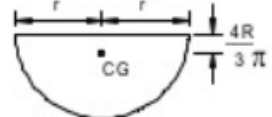
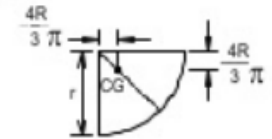
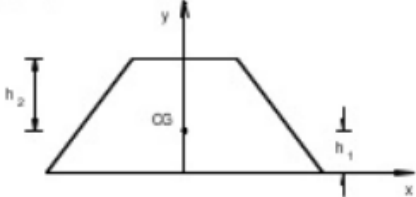
- ponto de aplicação da força peso exercida pela Terra.

$$\bar{x} = \frac{\Sigma \bar{x} \cdot A}{\Sigma A}$$

$$\bar{y} = \frac{\Sigma \bar{y} \cdot A}{\Sigma A}$$

# Centro de Gravidade

<p>retângulo</p> 	$x_{CG} = \frac{b}{2}$ $y_{CG} = \frac{h}{2}$
<p>triângulo</p> 	$x_{CG} = \frac{b}{3}$ $y_{CG} = \frac{h}{3}$

<p>círculo</p> 	$x_{CG} = 0$ $y_{CG} = 0$
<p>Semicírculo</p> 	$y_{CG} = \frac{4r}{3\pi}$
<p>¼ de círculo</p> 	$x_{CG} = \frac{4r}{3\pi}$ $y_{CG} = \frac{4r}{3\pi}$
<p>trapézio</p> 	$h_1 = \frac{h}{3} \cdot \frac{a+2b}{a+b}$ $h_2 = \frac{h}{3} \cdot \frac{2a+b}{a+b}$

**Ex. 1:** Calcule o CG da figura abaixo.

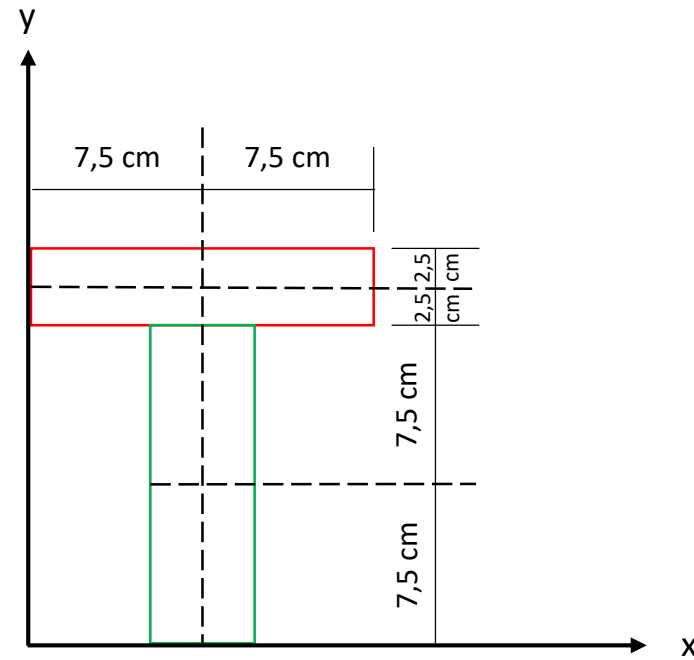
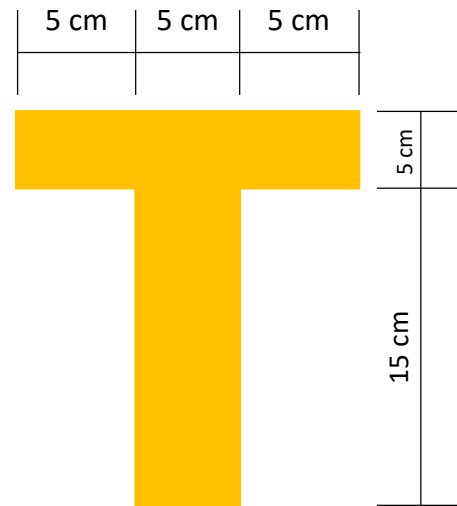


Fig.	x	y	A	x.A	y.A
1	7,5	7,5	75	562,5	562,5
2	7,5	17,5	75	562,5	1.312,5
		$\Sigma$	150	1.125	1.875

$$\bar{x} = \frac{\Sigma \bar{x} \cdot A}{\Sigma A}$$

$$\bar{x} = \frac{1.125}{150}$$

$$\bar{x} = 7,5 \text{ cm}$$

$$\bar{y} = \frac{\Sigma \bar{y} \cdot A}{\Sigma A}$$

$$\bar{y} = \frac{1.875}{150}$$

$$\bar{y} = 12,5 \text{ cm}$$

**Ex. 2:** Calcule o CG da figura abaixo.

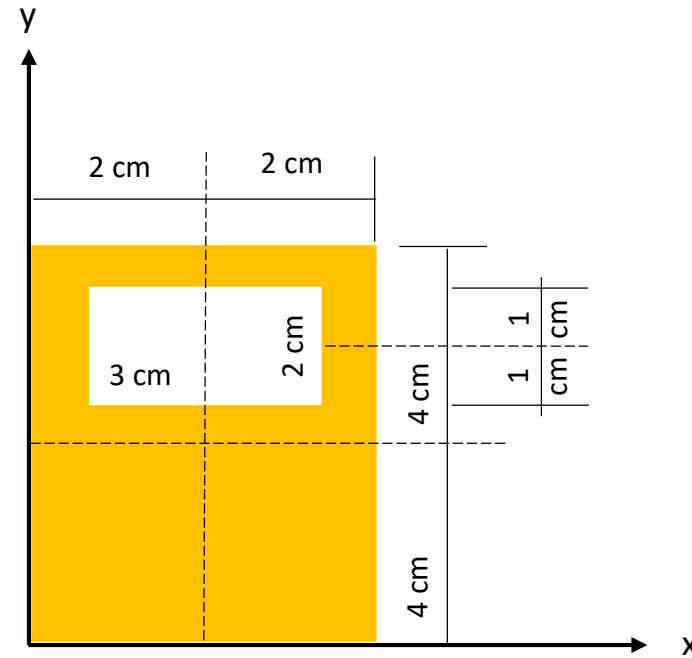
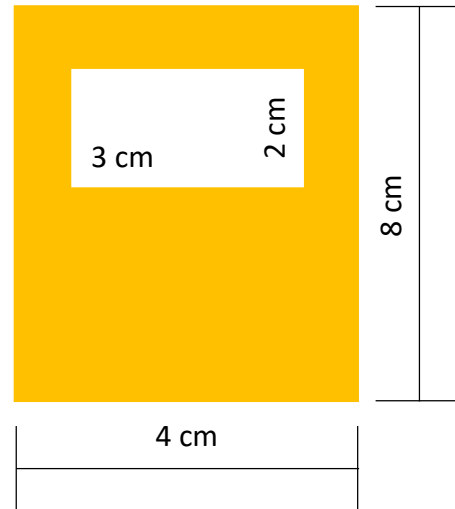


Fig.	x	y	A	x.A	y.A
1	2	4	32	64	128
2	2	6	6	12	36
		$\Sigma$	38	76	164

$$\bar{x} = \frac{\Sigma \bar{x} \cdot A}{\Sigma A}$$

$$\bar{x} = \frac{76}{38}$$

$$\bar{x} = 2 \text{ cm}$$

$$\bar{y} = \frac{\Sigma \bar{y} \cdot A}{\Sigma A}$$

$$\bar{y} = \frac{164}{38}$$

$$\bar{y} = 4,31 \text{ cm}$$

### Ex. 3: Calcule o CG da figura abaixo.

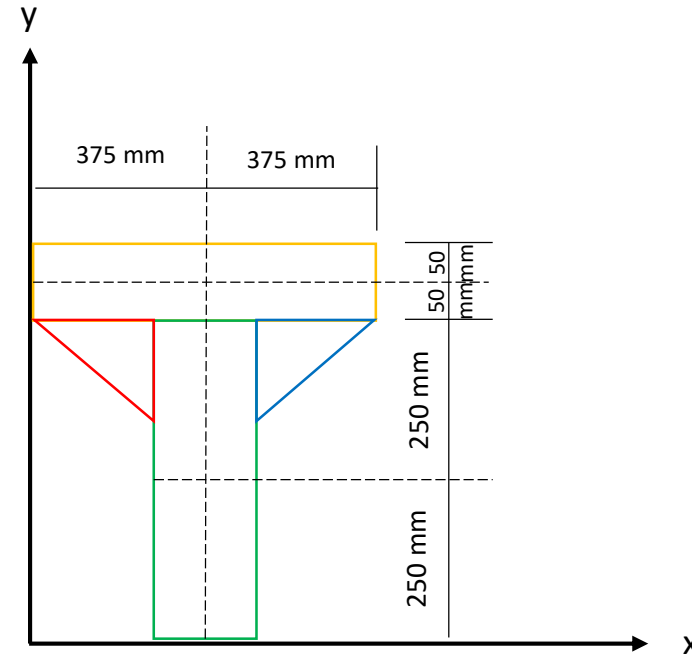
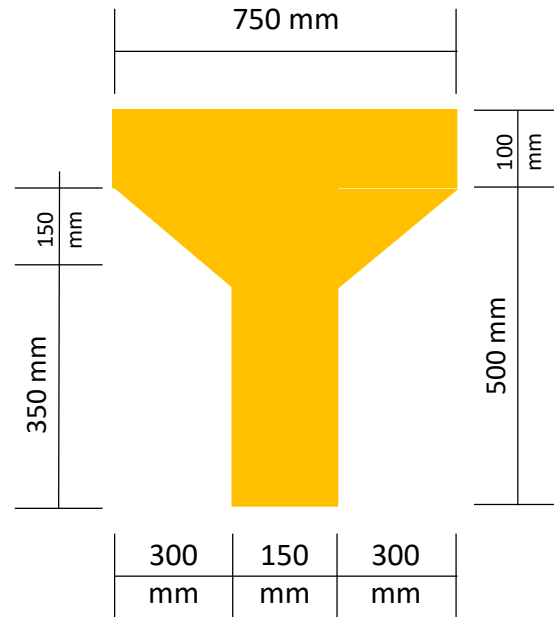


Fig.	x	y	A	x.A	y.A
1	375	550	75.000	28.125.000	41.250.000
2	100	400	22.500	2.250.000	9.000.000
3	550	400	22.500	12.375.000	9.000.000
4	375	250	75.000	28.125.000	18.750.000
		$\Sigma$	195.000	70.875.000	78.000.000

$$\bar{x} = \frac{\Sigma \bar{x} \cdot A}{\Sigma A}$$

$$\bar{x} = \frac{70.875.000}{195.000}$$

$$\bar{x} = 363,46 \text{ mm}$$

$$\bar{y} = \frac{\Sigma \bar{y} \cdot A}{\Sigma A}$$

$$\bar{y} = \frac{78.000.000}{195.000}$$

$$\bar{y} = 400 \text{ mm}$$

**Ex. 4:** Calcule o CG da figura abaixo.

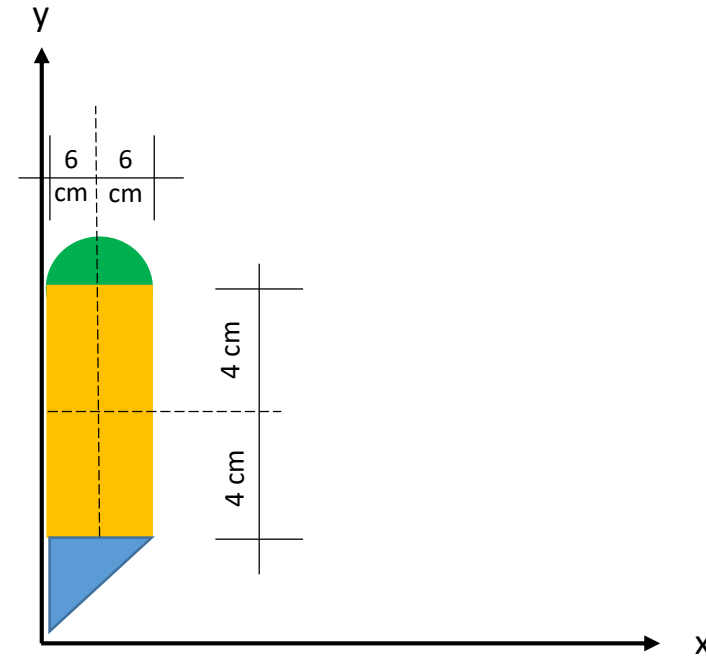
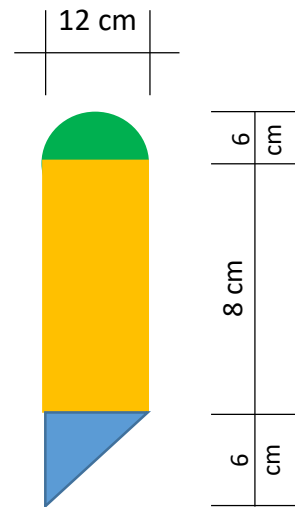


Fig.	x	y	A	x.A	y.A
1	4	2	36	144	72
2	6	10	96	576	960
3	6	16,5	56,5	339	932,25
		$\Sigma$	188,5	1.059	1.964,25

$$\bar{x} = \frac{\Sigma \bar{x} \cdot A}{\Sigma A}$$

$$\bar{x} = \frac{1.059}{188,5}$$

$$\bar{x} = 5,61 \text{ cm}$$

$$\bar{y} = \frac{\Sigma \bar{y} \cdot A}{\Sigma A}$$

$$\bar{y} = \frac{1.964,25}{188,5}$$

$$\bar{y} = 10,42 \text{ cm}$$

# Teste 2

- Conteúdo: Aulas 4 e 5
- Data limite para entrega: 07/10



Bons estudos!

