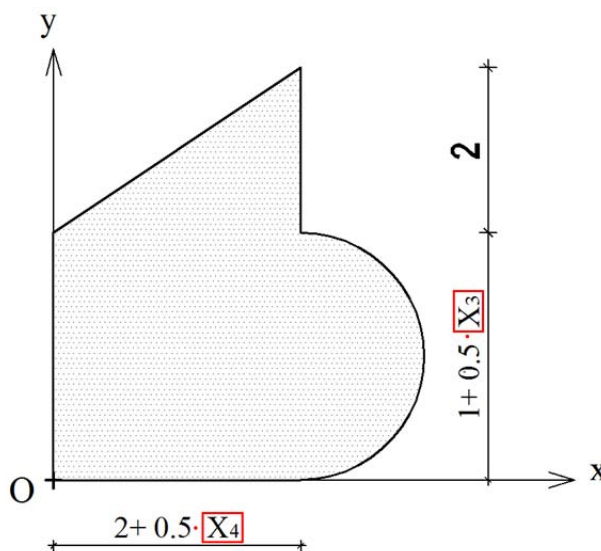
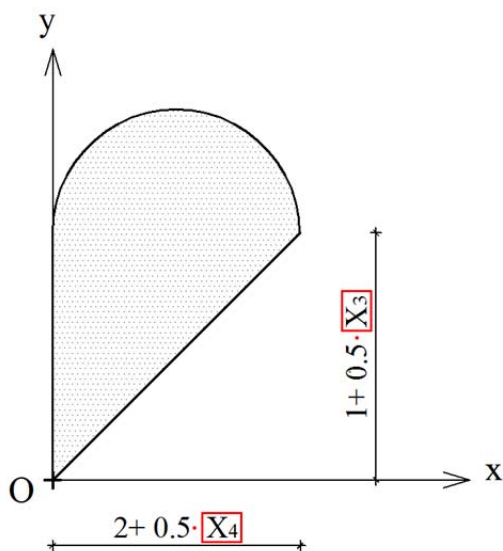




ZADACI KOJE STUDENTI RADE SAMOSTALNO: I, II i III - grupa

Zadatak: 1

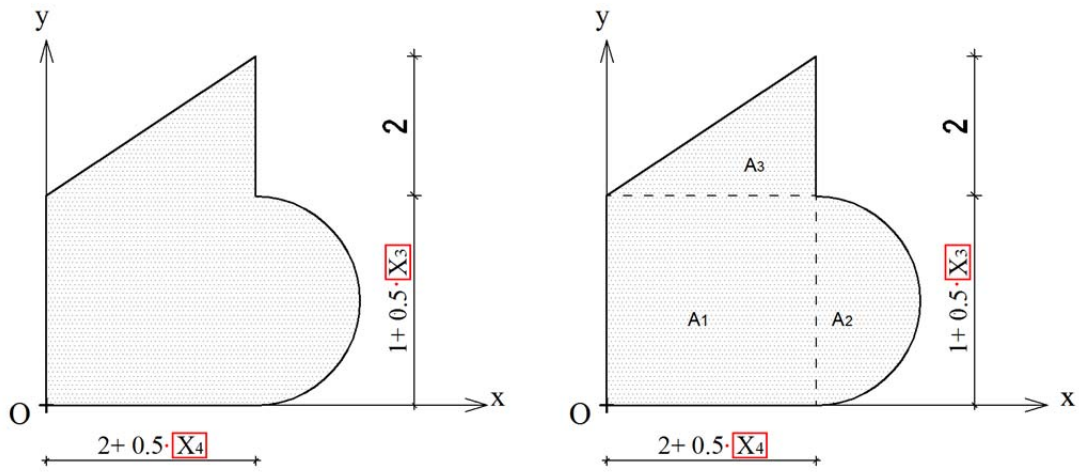
Odrediti analitičkim putem težište šrafirane površine.



NAPOMENA: Zadatke raditi po ugledu na date primere, kao i primere iz Praktikumuma i knjige. Zadatke raditi u slobodnoj formi na belim A4 papirima. Urađene zadatke fotografisati i poslati na E-mail pripadajuće grupe do kraja radne nedelje 14.06.2020. godine.

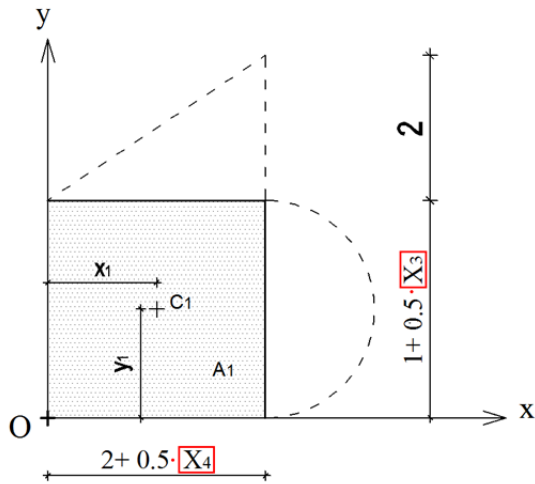
Zadatak: 2

Određiti analitičkim putem težište šrafirane površine.



Površine i koordinate težišta pojedinih delova složene površine su:

- Površina A_1 - pravougaonik

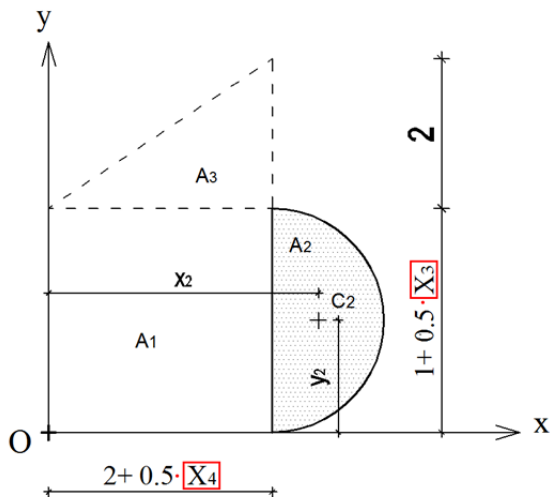


$A_1 = \dots$

$x_1 = \dots$

$y_1 = \dots$

- Površina A_2 - polukrug

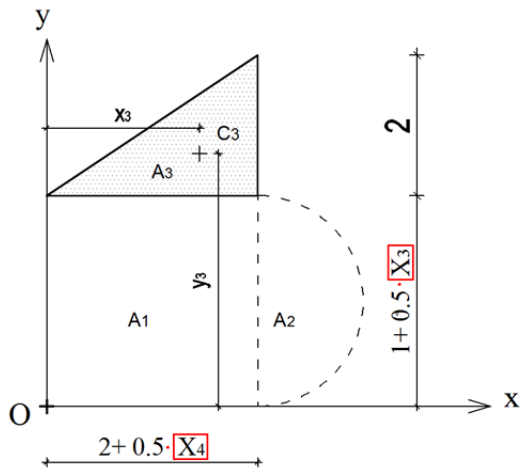


$A_2 = \dots$

$x_2 = \dots$

$y_2 = \dots$

- Površina A_3 - trougo



$$A_3 = \dots$$

$$x_3 = \dots$$

$$y_3 = \dots$$

- Koordinate težišta složene površine su:

$$x_C = \frac{\sum_{i=1}^n x_i A_i}{\sum_{i=1}^n A_i} = \frac{x_1 A_1 + x_2 A_2 + x_3 A_3}{A_1 + A_2 + A_3} = \dots$$

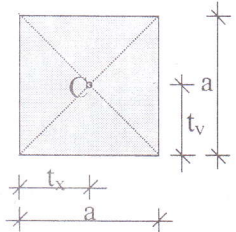
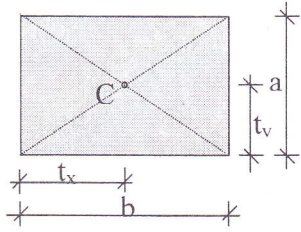
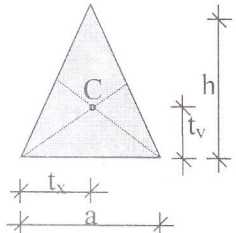
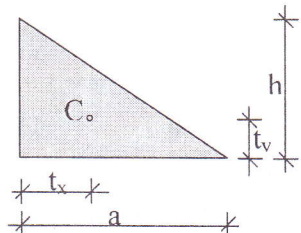
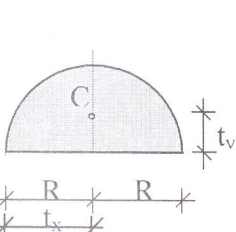
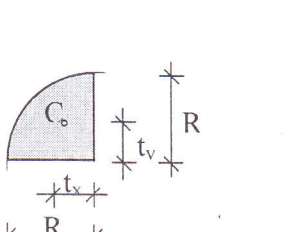
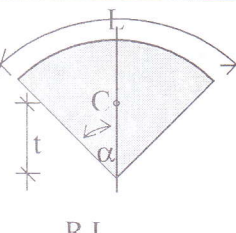
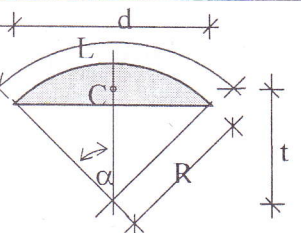
$$y_C = \frac{\sum_{i=1}^n y_i A_i}{\sum_{i=1}^n A_i} = \frac{y_1 A_1 + y_2 A_2 + y_3 A_3}{A_1 + A_2 + A_3} = \dots$$

Težište složene površine je tačka C (m, m).

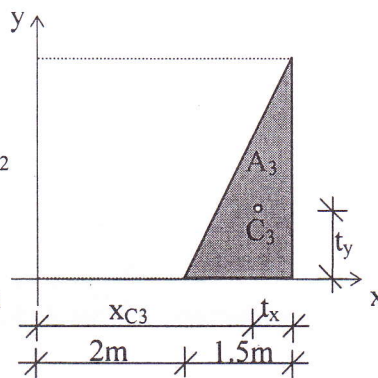
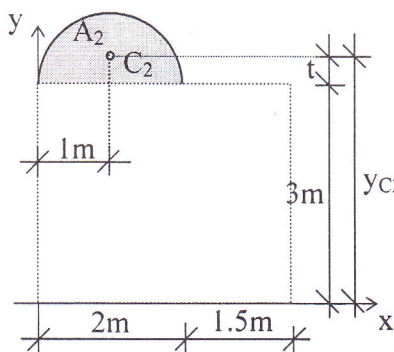
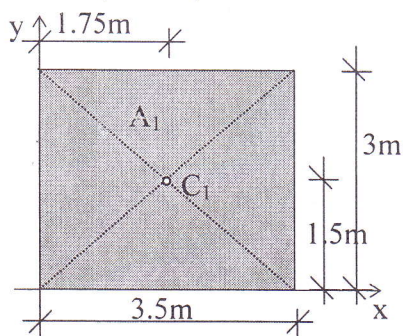
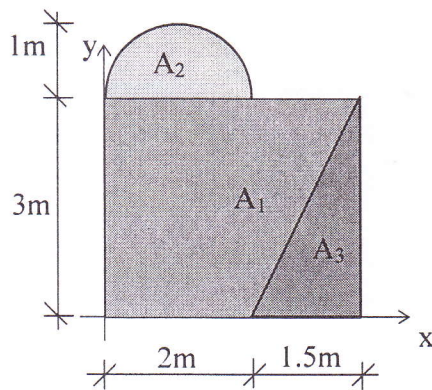
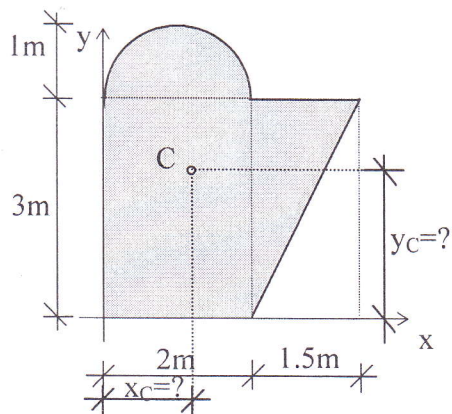
Vežba br. 15

Težište

Težišta nekih površina

<p>Kvadrat</p>  $t_x = t_y = \frac{a}{2}$	<p>Pravougaonik</p>  $t_x = \frac{b}{2} \quad t_y = \frac{a}{2}$
<p>Jednakokraki trougao</p>  $t_x = \frac{a}{2} \quad t_y = \frac{h}{3}$	<p>Pravougli trougao</p>  $t_x = \frac{a}{3} \quad t_y = \frac{h}{3}$
<p>Polukružna površina</p>  $t_x = R \quad t_y = \frac{4R}{3\pi}$	<p>Četvrtina kružne površine</p>  $t_x = t_y = \frac{4R}{3\pi}$
<p>Kružni isečak</p>  $A = \frac{RL}{2}; \quad L = 2R\alpha$ $t = \frac{2}{3} \frac{R^3 \sin \alpha}{A}$	<p>Kružni otsečak</p>  $A = \frac{RL}{2} - \frac{R \cos \alpha d}{2} \quad t = \frac{d^3}{12A}$

1. Odrediti težište date površine.



$$A_1 = a \cdot b = 3 \cdot 3.5 = 10.5 \text{ m}^2,$$

$$x_1 = \frac{b}{2} = \frac{3.5}{2} = 1.75 \text{ m}, \quad y_1 = \frac{a}{2} = \frac{3}{2} = 1.5 \text{ m}.$$

$$A_2 = \frac{R^2 \pi}{2} = \frac{1^2 \pi}{2} = 1.57 \text{ m}^2$$

$$t = \frac{4R}{3\pi} = \frac{4 \cdot 1}{3\pi} = 0.42 \text{ m}, \quad x_2 = R = 1 \text{ m}, \quad y_2 = 3 + t = 3.42 \text{ m}.$$

$$A_3 = \frac{a \cdot h}{2} = \frac{1.5 \cdot 3}{2} = 2.25 \text{ m}^2,$$

$$t_x = \frac{a}{3} = \frac{1.5}{3} = 0.5 \text{ m}, \quad t_y = \frac{h}{3} = \frac{3}{3} = 1 \text{ m},$$

$$x_3 = 3.5 - t_x = 3.5 - 0.5 = 3 \text{ m}, \quad y_3 = t_y = 1 \text{ m}.$$

Težište cele površine:

$$x_C = \frac{\sum_{i=1}^n x_i A_i}{\sum_{i=1}^n A_i} = \frac{x_1 A_1 + x_2 A_2 - x_3 A_3}{A_1 + A_2 - A_3} = \frac{1.75 \cdot 10.5 + 1 \cdot 1.57 - 3 \cdot 2.25}{10.5 + 1.57 - 2.25} = 1.34 \text{ m},$$

$$y_C = \frac{\sum_{i=1}^n y_i A_i}{\sum_{i=1}^n A_i} = \frac{y_1 A_1 + y_2 A_2 - y_3 A_3}{A_1 + A_2 - A_3} = \frac{1.5 \cdot 10.5 + 3.42 \cdot 1.57 - 1 \cdot 2.25}{10.5 + 1.57 - 2.25} = 1.92 \text{ m}.$$