

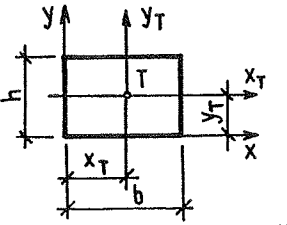
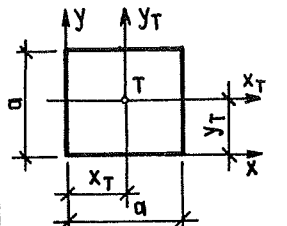
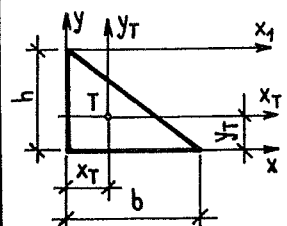
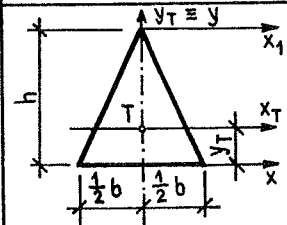
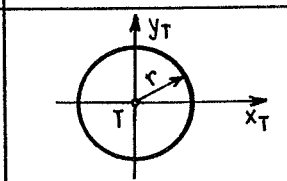
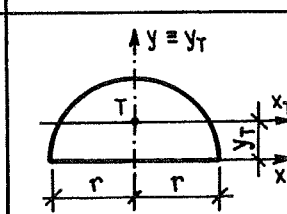
TVAR OBRAZCE	PLOCHA A	SOUŘADNICE TĚŽIŠTĚ $C_g(y_c, z_c)$	AXIÁLNÍ MOMENTY SETRVAČNOSTI I	DEVIÁČNÍ MOMENTY D
	$A = bh$	$y_c = \frac{b}{2}$ $z_c = \frac{h}{2}$	$I_{Y_c} = \frac{bh^3}{12}, I_{Z_c} = \frac{hb^3}{12}$ $I_Y = \frac{bh^3}{3}, I_Z = \frac{hb^3}{3}$	$D_{YZ} = \frac{b^2h^2}{4}$ $D_{Y_cZ_c} = 0$
	$A = \frac{bh}{2}$	$z_c = \frac{h}{3}$	$I_{Y_c} = \frac{bh^3}{36}$ $I_Y = \frac{bh^3}{12}$ $I_{Y'} = \frac{bh^3}{4}$	
	$A = \frac{bh}{2}$	$z_c = \frac{h}{3}$	$I_{Y_c} = \frac{bh^3}{36}, I_{Z_c} = \frac{hb^3}{48}$ $I_Y = \frac{bh^3}{12}$	$D_{Y_cZ_c} = 0$
	$A = \frac{bh}{2}$	$y_c = \frac{b}{3}$ $z_c = \frac{h}{3}$	$I_{Y_c} = \frac{bh^3}{36}, I_{Z_c} = \frac{hb^3}{36}$ $I_Y = \frac{bh^3}{12}, I_Z = \frac{hb^3}{12}$ $I_{Y'} = \frac{bh^3}{4}$	$D_{Y_cZ_c} = -\frac{b^2h^2}{72}$ $D_{YZ} = \frac{b^2h^2}{24}$ $D_{Y'Z'} = -\frac{b^2h^2}{8}$ ZNAMÉNKA!
	$A = \pi r^2 = \frac{\pi d^2}{4} \doteq 3,1416 r^2 = 0,7854 d^2$		$I_{Y_c} = I_{Z_c} = \frac{\pi r^4}{4} = \frac{\pi d^4}{64} \doteq 0,7854 r^4 = 0,0491 d^4$	$D_{Y_cZ_c} = 0$
	$A = \frac{2}{3} bh$	$y_c = \frac{3}{8} b$ $z_c = \frac{2}{5} h$	$I_{Y_c} = \frac{8}{175} bh^3 \doteq 0,0457 bh^3$ $I_{Z_c} = \frac{19}{480} hb^3 \doteq 0,0396 hb^3$ $I_Y = \frac{16}{105} bh^3 \doteq 0,1524 bh^3$ $I_Z = \frac{2}{15} hb^3 \doteq 0,1333 hb^3$ $I_{Y'} = \frac{2}{7} bh^3 \doteq 0,2857 bh^3$ $I_{Z'} = \frac{3}{10} hb^3 \doteq 0,3000 hb^3$	

Pokračování tabulky 3.

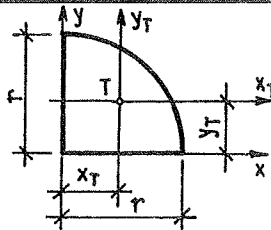
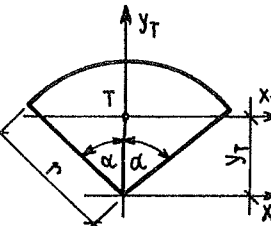
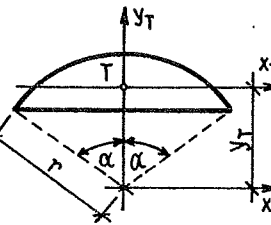
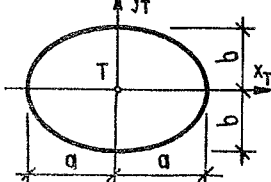
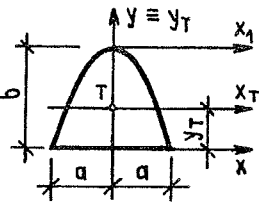
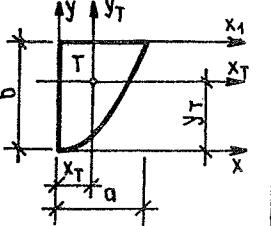
TVAR OBRAZCE	PLOCHA A	SOUŘADNICE TEŽIŠTĚ $C_g (y_c, z_c)$	AXIÁLNÍ MOMENTY SETRVAČNOSTI I	DEVIACNÍ MOMENTY D
	$A = \frac{bh}{3}$	$y_c = \frac{3}{4} b$  $z_c = \frac{3}{10} h$	$I_{y_c} = \frac{37}{2100} bh^3 \approx 0,0176 bh^3$ $I_{z_c} = \frac{1}{80} hb^3 \approx 0,0125 hb^3$ $I_y = \frac{1}{21} bh^3 \approx 0,0476 bh^3$ $I_z = \frac{1}{5} hb^3 \approx 0,2000 hb^3$ $I_{y'} = \frac{19}{105} bh^3 \approx 0,1810 bh^3$ $I_{z'} = \frac{1}{30} hb^3 \approx 0,0333 hb^3$	
	$A = \frac{\pi r^2}{2} = \frac{\pi d^2}{8} \approx 1,5708 r^2 = 0,3927 d^2$	$z_c = \frac{4r}{3\pi} = \frac{2d}{3\pi} \approx 0,4244 r$	$I_{y_c} = \left(\frac{\pi}{8} - \frac{8}{9\pi}\right) r^4 \approx 0,1098 r^4$ $I_{z_c} = I_y = \frac{\pi r^4}{8} = \frac{\pi d^4}{128} \approx 0,3928 r^4 = 0,0246 d^4$	$D_{y_c z_c} = 0$
	$A = \frac{\pi r^2}{4} = \frac{\pi d^2}{16} \approx 0,7854 r^2 = 0,1964 d^2$	$y_c = z_c = \frac{4r}{3\pi} = \frac{2d}{3\pi} \approx 0,4244 r$	$I_{y_c} = I_{z_c} = \left(\frac{\pi}{16} - \frac{4}{9\pi}\right) r^4 \approx 0,0549 r^4$ $I_y = I_z = \frac{\pi r^4}{16} \approx 0,1963 r^4$	$D_{y_c z_c} = \left(\frac{1}{8} - \frac{4}{9\pi}\right) r^4 \approx -0,0165 r^4$ $D_{yz} = \frac{r^4}{8}$ <b>ZNAMÉNKA!</b>
	$A = \widehat{\alpha} r^2 = \text{arc} \alpha r^2 = \frac{\alpha^\circ}{180^\circ} \pi r^2$	$z_c = \frac{2}{3} r \frac{\sin \alpha}{\alpha}$	$I_{y_c} = r^4 \left( \frac{2\widehat{\alpha} + \sin 2\alpha}{8} - \frac{4 \sin^2 \alpha}{9\widehat{\alpha}} \right)$ $I_{z_c} = \frac{r^4}{8} (2\widehat{\alpha} - \sin 2\alpha)$ $I_y = \frac{r^4}{8} (2\widehat{\alpha} + \sin 2\alpha)$	$D_{y_c z_c} = 0$
	$A = r^2 \left( \widehat{\alpha} - \frac{\sin 2\alpha}{2} \right)$	$z_c = \frac{4r \sin^2 \alpha}{3(2\widehat{\alpha} - \sin 2\alpha)}$	$I_{y_c} = r^4 \left( \frac{4\widehat{\alpha} - \sin 4\alpha}{16} - \frac{4 \sin^4 \alpha}{9 \widehat{\alpha} - \sin 2\alpha} \right)$ $I_{z_c} = \frac{r^4}{48} (12\widehat{\alpha} - 8\sin 2\alpha + \sin 4\alpha)$ $I_y = \frac{r^4}{16} (4\widehat{\alpha} - \sin 4\alpha)$	$D_{y_c z_c} = 0$
	$A = \pi ab$		$I_{y_c} = \frac{\pi}{4} ab^3$ $I_{z_c} = \frac{\pi}{4} ba^3$	$D_{y_c z_c} = 0$

TÉŽIŠTĚ, MOMENTY SETRVAČNOSTI A DEVIČNÍ MOMENTY  
VYBRANÝCH ROVINNÝCH OBRAZCŮ

# TABULKA I.

TVAR OBRAZCE		PLOCHA A	SOUŘADNICE TÉŽIŠTĚ $x_T, y_T$	AXIÁLNÍ MOMENTY SETRVAČNOSTI J	DEVIČNÍ MOMENTY D
OBDELNÍK		$b \cdot h$	$x_T = \frac{b}{2}$ $y_T = \frac{h}{2}$	$J_{x_T} = \frac{1}{12} b h^3$ ; $J_{y_T} = \frac{1}{12} b^3 h$ $J_x = \frac{1}{3} b h^3$ ; $J_y = \frac{1}{3} b^3 h$	$D_{x_T y_T} = 0$ $D_{xy} = \frac{1}{4} b^2 h^2$
ČTVEREC		$a^2$	$x_T = \frac{a}{2}$ $y_T = \frac{a}{2}$	$J_{x_T} = J_{y_T} = \frac{1}{12} a^4$ $J_x = J_y = \frac{1}{3} a^4$	$D_{x_T y_T} = 0$ $D_{xy} = \frac{1}{4} a^4$
PRÁVOÚHLÝ TROJÚHELNÍK		$\frac{1}{2} b h$	$x_T = \frac{1}{3} b$ $y_T = \frac{1}{3} h$	$J_{x_T} = \frac{1}{36} b h^3$ ; $J_{y_T} = \frac{1}{36} b^3 h$ $J_x = \frac{1}{12} b h^3$ ; $J_y = \frac{1}{12} b^3 h$ $J_{x_1} = \frac{1}{4} b h^3$	$D_{x_T y_T} = -\frac{1}{72} b^2 h^2$ $D_{xy} = \frac{1}{24} b h$ <small><math>D_{x_T y_T} = +\frac{1}{72} b^2 h^2</math> PODLE POLOHY OBRAZCE</small>
ROVNOHRAMENNÝ TROJÚHELNÍK		$\frac{1}{2} b h$	$y_T = \frac{1}{3} h$	$J_{x_T} = \frac{1}{36} b h^3$ ; $J_{y_T} = \frac{1}{48} b^3 h$ $J_x = \frac{1}{12} b h^3$ $J_{x_1} = \frac{1}{4} b h^3$	$D_{x_T y_T} = 0$ $D_{xy} = 0$
KRUH		$\pi r^2$	-	$J_{x_T} = J_{y_T} = \frac{1}{4} \pi r^4$	$D_{x_T y_T} = 0$
PŮLKRUH		$\frac{1}{2} \pi r^2$	$y_T = \frac{4r}{3\pi} \doteq 0,4244r$	$J_{x_T} = \left(\frac{\pi}{8} - \frac{8}{9\pi}\right) r^4 \doteq 0,1098 r^4$ $J_{y_T} = \frac{1}{8} \pi r^4$ $J_x = \frac{1}{8} \pi r^4$	$D_{x_T y_T} = 0$ $D_{xy} = 0$

POKRAČOVÁNÍ TABULKY I.

TVAR OBRAZCE	PLOCHA A	SOUŘADNICE TĚŽIŠTĚ $x_T, y_T$	AXIÁLNÍ MOMENTY SETRVAČNOSTI J	DEVIACNÍ MOMENTY D
<p>ČTYRČKRUH</p> 	$\frac{1}{4} \pi r^2$	$x_T = y_T =$ $= \frac{4}{3} \frac{r}{\pi} \approx$ $\approx 0,4244 r$	$J_{x_T} = J_{y_T} = \frac{1}{2} \left( \frac{\pi}{16} - \frac{4}{9\pi} \right) r^4 \approx$ $\approx 0,0549 r^4$ $J_x = J_y = \frac{1}{16} \pi r^4$	$D_{x_T y_T} = \left( \frac{1}{8} - \frac{4}{9\pi} \right) r^4 \approx$ $\approx -0,0165 r^4$ $D_{xy} = \frac{r^4}{8}$ (znaménka se mění podle polohy obrazce)
<p>KRUHOVÁ VÝSEČ</p> 	$\alpha \cdot r^2 =$ $= \frac{\alpha^\circ}{180^\circ} \pi r^2$	$y_T =$ $= \frac{2}{3} \frac{r \cdot \sin \alpha}{\alpha}$	$J_{x_T} = r^4 \left( \frac{2\alpha + \sin 2\alpha}{8} - \frac{4 \sin^2 \alpha}{9\alpha} \right)$ $J_{y_T} = \frac{r^4}{8} (2\alpha - \sin 2\alpha)$ $J_x = \frac{r^4}{8} (2\alpha + \sin 2\alpha)$	$D_{x_T y_T} = 0$
<p>KRUHOVÁ ÚSEČ</p> 	$r^2 \left( \alpha - \frac{1}{2} \sin 2\alpha \right)$	$y_T =$ $= \frac{2}{3} \frac{r \cdot \sin^3 \alpha}{\alpha - \sin \alpha \cos \alpha}$	$J_{x_T} = r^4 \left( \frac{4\alpha - \sin 4\alpha}{16} - \frac{4}{9} \frac{\sin^6 \alpha}{\alpha - \sin 2\alpha} \right)$ $J_{y_T} = \frac{r^4}{48} (12\alpha - 8 \sin 2\alpha + \sin 4\alpha)$ $J_x = \frac{r^4}{16} (4\alpha - \sin 4\alpha)$	$D_{x_T y_T} = 0$
<p>ELIPSA</p> 	$\pi \cdot a \cdot b$	—	$J_{x_T} = \frac{1}{4} \pi a b^3$ $J_{y_T} = \frac{1}{4} \pi a^3 b$	$D_{x_T y_T} = 0$
<p>PARABOLICKÁ ÚSEČ</p> 	$\frac{4}{3} ab$	$y_T = \frac{2}{5} h$	$J_{x_T} = \frac{16}{175} ab^3 \approx 0,0914 ab^3$ $J_{y_T} = \frac{4}{15} a^3 b \approx 0,2667 a^3 b$ $J_x = \frac{32}{105} ab^3 \approx 0,3048 ab^3$ $J_{x_1} = \frac{4}{7} ab^3 \approx 0,5714 ab^3$	$D_{x_T y_T} = 0$
<p>POLOVINA PARABOLICKÉ ÚSEČE</p> 	$\frac{2}{3} ab$	$x_T = \frac{3}{8} a$ $y_T = \frac{3}{5} b$	$J_{x_T} = \frac{8}{175} ab^3$ $J_{y_T} = \frac{19}{480} a^3 b$ $J_x = \frac{2}{7} ab^3$ $J_y = \frac{2}{15} a^3 b$ $J_{x_1} = \frac{16}{105} ab^3$	$D_{x_T y_T} = \frac{1}{60} a^2 b^2$ $D_{xy} = \frac{1}{6} a^2 b^2$ (znaménko se mění podle polohy obrazce)