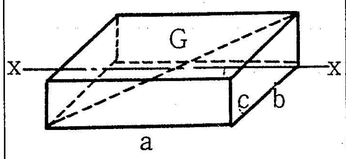
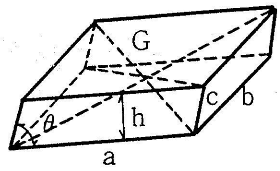
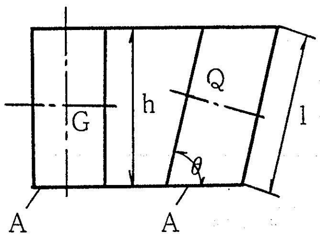
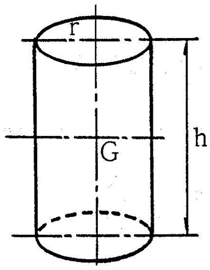
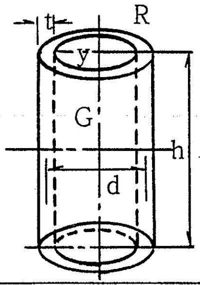
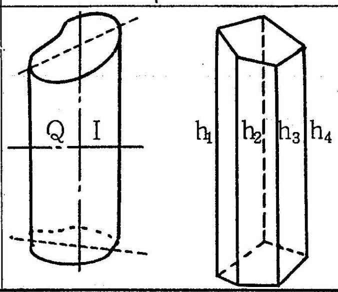
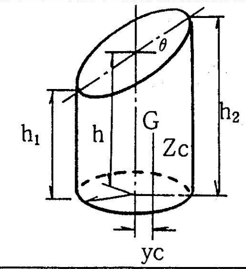
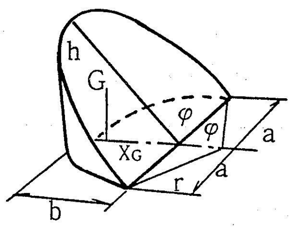
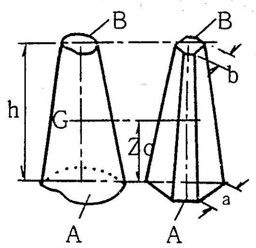
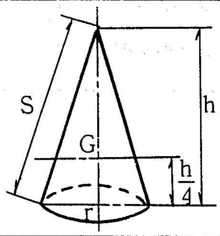
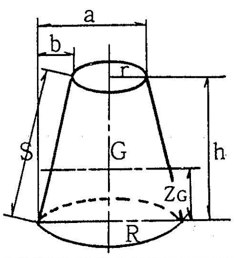
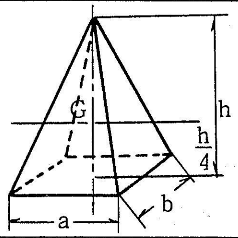
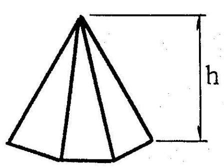
8－14　立体図形の諸表

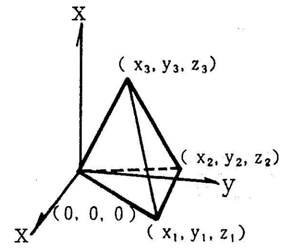
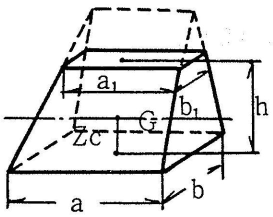
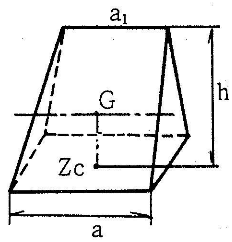
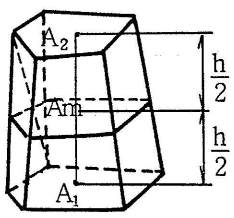
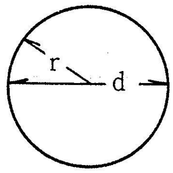
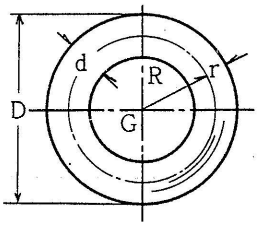
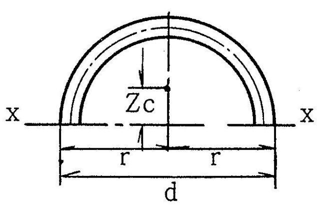
V：立体の体積　　　　　M：とう体のとう面積又は錘体の錘面積

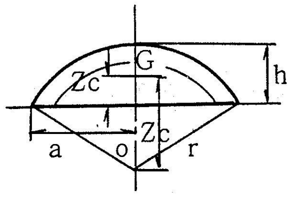
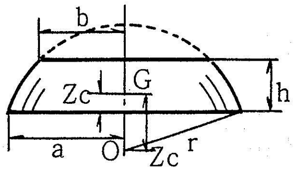
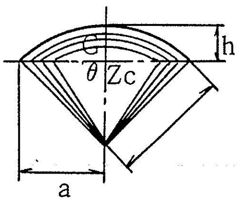
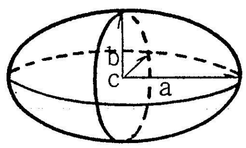
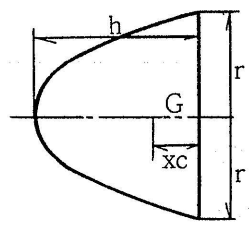
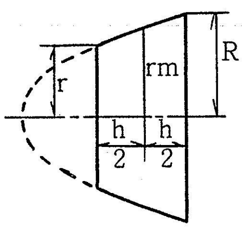
F：立体の全表面積　　　A：とう体又は錘体の底面積

G：立体の重心

直六面体		$V = abc$ $F = 2(ab+bc+ca)$ $d = \sqrt{a^2+b^2+c^2}$ ただしdは対角線の長さ
平行六面体		$V = abh = abc\,\theta,\ \ h = c\sin\theta$ $F = 2[ab+(a+b)h] = 2[ab+(a+b)c\sin\theta]$
とう体		$V = Ah = Ql$ $M = Uh = Cl$ $F = M + 2A$ $Q = A\sin\theta$ A＝底面積　　C＝横断面の周辺長 Q＝横断面積　U＝底面の周辺長
直円塔		$V = \pi r^2 h$ $M = 2\pi rh$ $A = \pi r^2$ $F = 2\pi r(r+h)$
中空円塔		$V = \pi(R^2-r^2)h = \pi(2R-t)th$ $= \pi(2r+t)th$ $= \pi dth$
斜截とう体		$V = Ql = \frac{Q}{n}(h_1+h_2+\cdots\cdots+hn)$ l＝両端面の図心を結ぶ線分の長さ h＝角とうにおける各辺の長さ Q＝とう体の軸lに垂直な横断面積

斜截直円とう		$V=\pi r^2 h=\frac{1}{2}\pi r^2(h_1+h_2)$ $M=2\pi rh=\pi r(h_1+h_2)$ $y_c=\frac{r^2\tan\theta}{4h}$, $Z_c=\frac{h}{2}+\frac{r^2\tan^2\theta}{8h}$
蹄形		$V=\frac{h}{3b}[2a^2-3(r-b)r^2\varphi+3(r-b)^2a]$ $M=\frac{2rh}{6}[a+(b-r)\varphi]$ 底面が半円の場合（a＝b＝r） $V=\frac{2r^2h}{3}$, $M=2rh$, $x_c=\frac{3}{16}\pi r$, $Z_c=\frac{3}{32}\pi h$
截頭スイ体		$V=\frac{h}{3}[A+\sqrt{AB}+B$ $Z_c=\frac{h}{4}\frac{A+2\sqrt{AB}+3B}{A+\sqrt{AB}+B}$ A.B＝截頭スイ体の底面積 とくに角スイにおいては $V=\frac{Ah}{3}\left[1+\frac{b}{a}+\left(\frac{b}{a}\right)^2\right]$
直円スイ		$V=\frac{\pi r^2 h}{3}$, $M=\pi r\sqrt{r^2+h^2}=\pi rs$ $s=\sqrt{r^2+h^2}$ $F=M+A=\pi r(\sqrt{r^2+h^2}+r)=\pi r(s+r)$
截頭円スイ		$V=\frac{\pi h}{3}(R^2+Rr+r^2)=\frac{\pi h}{4}\left(a^2+\frac{1}{3}b^2\right)$ $M=\pi as$ $a=R+r$ $Z_G=\frac{h}{4}\frac{R^2+2Rr+3r^2}{R^2+Rr+r^2}$
直四角スイ		$V=\frac{abh}{3}$
多角スイ		$V=\frac{Bh}{3}$ B＝底面積 $Z_c=\frac{h}{4}$

三角スイ		$V=\pm\frac{1}{6}\begin{vmatrix} x_1 & y_1 & z_1 \\ x_2 & y_2 & z_2 \\ x_3 & y_3 & z_3 \end{vmatrix}$ ただし4頂点の座標をそれぞれ（0, 0, 0），（x_1, y_1, z_1）（x_2, y_2, z_2），（x_3, y_3, z_3）とする。
オペリスク		$V=\frac{h}{6}[(2a+a_1)b+(2a_1+a)b_1]$ $=\frac{h}{6}[ab+(a+a_1)(b+b_1)+a_1b_1]$ $Zc=\frac{h}{2}\ \frac{ab+ab_1+a_1b+3a_1b_1}{2ab+ab_1+a_1b+2a_1b_1}$
くさび形		$V=\frac{bh}{6}(2a+a_1)$ $Zc=\frac{h}{2}\ \frac{a+a_1}{2a+a_1}$
プリズモイド		$V=\frac{h}{6}(A_1+4Am+A_2)$ A_1，A_2：平行な両端面積 h：A_1，A_2の垂直距離 Am：$\frac{h}{2}$の断面積
球		$V=\frac{4}{3}\pi r^3=4.189r^3=\frac{\pi}{6}d^3=0.524d^3$ $F=4\pi r^2=\pi d^2$
円形断面の環		$V=2\pi^2Rr^2=19.739Rr^2\fallingdotseq 20Rr^2$ $F=4\pi^2Rr=39.478Rr\fallingdotseq 40Rr$
半球		$V=\frac{2}{3}\pi r^3=\frac{\pi}{12}d^3$ $M=2\pi r^2=\frac{\pi d^2}{2}$ $Zc=\frac{3}{8}r=0.375r$

欠球		$V=\frac{\pi h}{2}(3a^2+h^2)=\frac{\pi h^2}{3}(3r-h)$ $M=\pi(a^2+h^2)=2\pi rh$ $Zc=\frac{h}{4}\frac{4r-h}{3r-h}$, $Zc=\frac{3}{4}\frac{(2r-h)^2}{3r-h}$ $a^2=h(2r-h)$
球帯		$V=\frac{\pi h}{6}(3a^2+3b^2+h^2)$, $M=2\pi rh$ $Zc=\frac{h}{2}\frac{2a^2+4b^2+h^2}{3a^2+3b^2+h^2}$ $Zc'=\frac{3}{2}\frac{a^4-b^4}{(3a^2+3b^2+h^2)h}$ $r^2=a^2+\left(\frac{a^2-b^2-h^2}{2h}\right)^2$
球底円スイ		$V=\frac{2}{3}\pi r^2h$, $F=\pi r(2h+a)$ $Zc=\frac{3r}{8}(1+\cos\theta)=\frac{3}{8}(2r-h)$ $h=r(1-\cos\alpha)$, $a=r\sin\alpha$
楕円体		$V=\frac{4}{3}\pi abc$ 回転楕円体の場合 $b=c$ $V=\frac{4}{3}\pi ab^2$
回転放物線体		$V=\frac{\pi}{2}r^2h$ $xc=\frac{h}{3}$
回転放物線体の截片		$V=\frac{\pi}{2}(R^2+r^2)h=\pi rm^2h$