c) Obliczyć objętości V elementu mierzonego oraz jej niepewność pomiarową uc(V), tuleja

Dane	Wartość[mm]
$u(x)$	0.067
$\overline{h}$	34.17
$\overline{dwew}$	12.215
$\overline{dzew}$	15.858

Obliczanie Objetosci

$V = \overline{h}\pi r^2 = \overline{h}\pi(\overline{dzew} \ - \overline{dwew}\ )^2 = 34.17 * \pi(15.858 - 12.215\ )^2 =$
$34.17 * \pi(3.643\ )^2 = 34.17 * \pi * 13.271449 = 453.4854123\,\pi$

$\frac{dV}{dh}u(h) = \pi(dzew - dwew)^2$

h	34.17
dzew-dwew	3.643
(dzew-dwew)^2	13.27145
((dzew-dwew)^2)^2	176.1314

$\frac{dV}{dh}u(h) = \pi(dzew - dwew)^2 = 13.271449\pi$

$\frac{dV}{ddwew}u(dwew) = 2h\pi(dwew\text{-}dzew)$

2h	68.34
(dwew-dzew)	-3.643
2h*(dwew-dzew)	-248.963
(2h*(dwew-dzew))^2	61982.39

$\frac{dV}{ddwew}u(dwew) = 2h\pi(dwew\text{-}dzew) =$
$68.34\pi*(-3.643) = -248.96262\pi$

$\frac{dV}{ddzew}u(dzew) = 2h\pi(dzew\text{-}dwew)$

2h	68.34
(dzew-dwew)	3.643
2h*(dwew-dzew)	248.9626
(2h*(dwew-dzew))^2	61982.39

$\frac{dV}{ddzew}u(dzew) = 2h\pi(dzew\text{-}dwew) =$
$68.34\pi*(3.643) = 248.96262\pi$

$u_c(V) = \sqrt{(\frac{dV}{ddwew}u(dwew))^2 + (\frac{dV}{ddzew}u(dzew))^2 + (\frac{dV}{dh}u(h))^2} =$
$\sqrt{(\frac{dV}{ddwew}u(dwew))^2 + (\frac{dV}{ddze}u(dzew))^2 + (\frac{dV}{dh}u(h))^2} =$
$\sqrt{(2h\pi(dwew - dzew)\ )^2 + (2h\pi(dzew - dwew))^2 + (\pi(dzew - dwew))^2} =$
$\sqrt{61982.38616\pi^2\ + 61982.38616\pi^2\ + 176.1313586\pi^2}\ = \sqrt{124140.9037\pi^2}\ = 352.3363502\pi$
$\approx 360\pi$