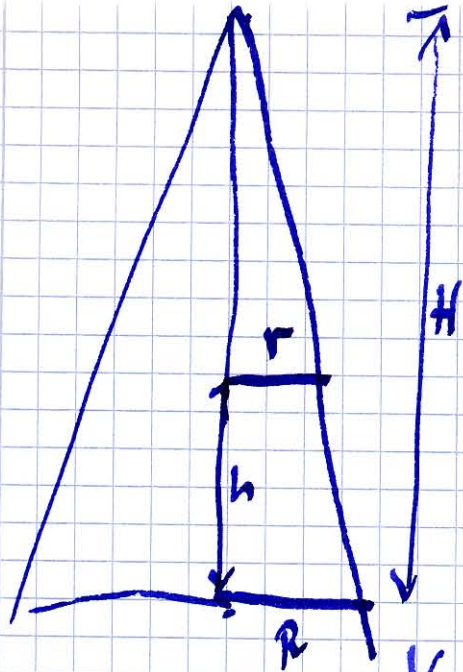

Kegelstumpf Volumen Formel Herleitung Ha 08

$$\frac{R}{H} = \frac{r}{H-h}$$

$$Hr = (H-h)R$$

$$H(R-r) = hR$$

$$H = \frac{hR}{R-r}$$

$$V_{St} = V_K - V_k = \frac{1}{3}\pi R^2 \cdot H - \frac{1}{3}\pi r^2 \cdot (H-h)$$

$$= \frac{\pi}{3}\left(R^2 \frac{hR}{R-r} - r^2\left(\frac{hR}{R-r} - h\right)\right)$$

$$= \frac{\pi}{R-r}\left(R^3 h - r^2(hR - h(R-r))\right)$$

$$= \frac{\pi}{R-r}\left(R^3 h - r^3 h\right)$$

$$= \frac{\pi}{R-r}\left(R^3 - r^3\right)h$$

$$(R^3 - r^3) : (R-r) = R^2 + rR + r^2$$

$$-(R^3 - rR^2)$$

$$rR^2 - r^3$$

$$-(rR^2 - r^2R)$$

$$r^2R - r^3$$

$$-(r^2R - r^3)$$

$$0$$

$$\boxed{V_{St} = \frac{\pi}{3}\left(R^2 + rR + r^2\right)h}$$