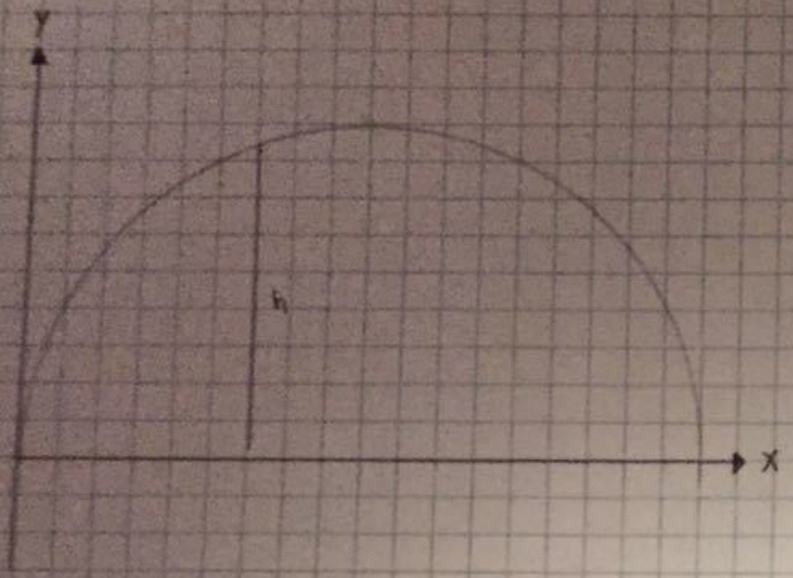
Aufgabe 21 $y = \sqrt{r^2 - (x-r)^2}$, $r = 5m$ $V = \pi \int_0^h f(x)^2 dx = \pi \int_0^h (2rx - x^2) dx$



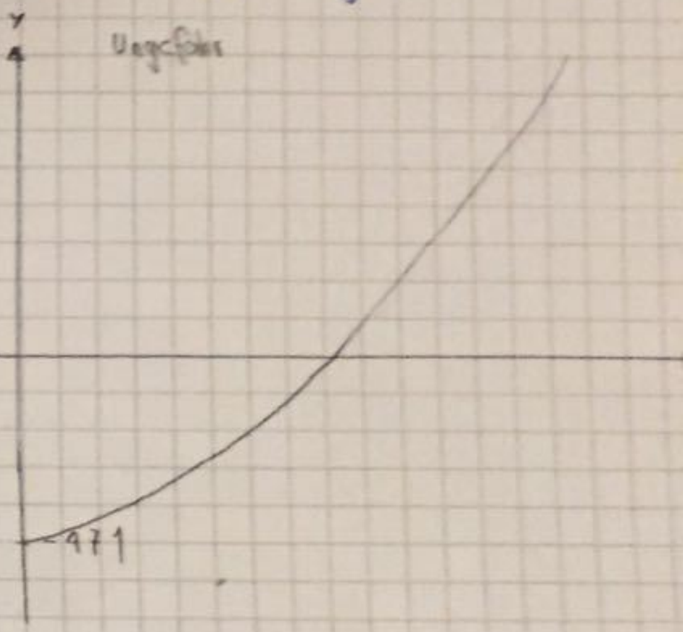
$= \pi [rx^2 - \frac{1}{3}x^3]_0^h = \pi (rh^2 - \frac{1}{3}h^3) = \pi r h^2 - \frac{1}{3}h^3$

$g(x) = -\frac{1}{3}x^3 + \pi r x^2 - 471$

$g'(x) = -x^2 + 2\pi r x$

$x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$

absoloter Fehler von hochstens $\varepsilon = 0.001$



Startwert $x_0 = 9$

$x_1 = x_0 - \frac{f(x_0)}{f'(x_0)} = \underline{6.2324}$

$g(x_1 + \varepsilon)\, g(x_1 - \varepsilon) > 0$

$x_2 = x_1 - \frac{f(x_1)}{f'(x_1)} = 5.8606$

$g(x_2 + \varepsilon)\, g(x_2 - \varepsilon) > 0$

$x_3 = x_2 - \frac{f(x_2)}{f'(x_2)} = \underline{\underline{5.8511}}$

$g(x_3 + \varepsilon)\, g(x_3 - \varepsilon) < 0$