ENGR 207 Assignment Bonus 2

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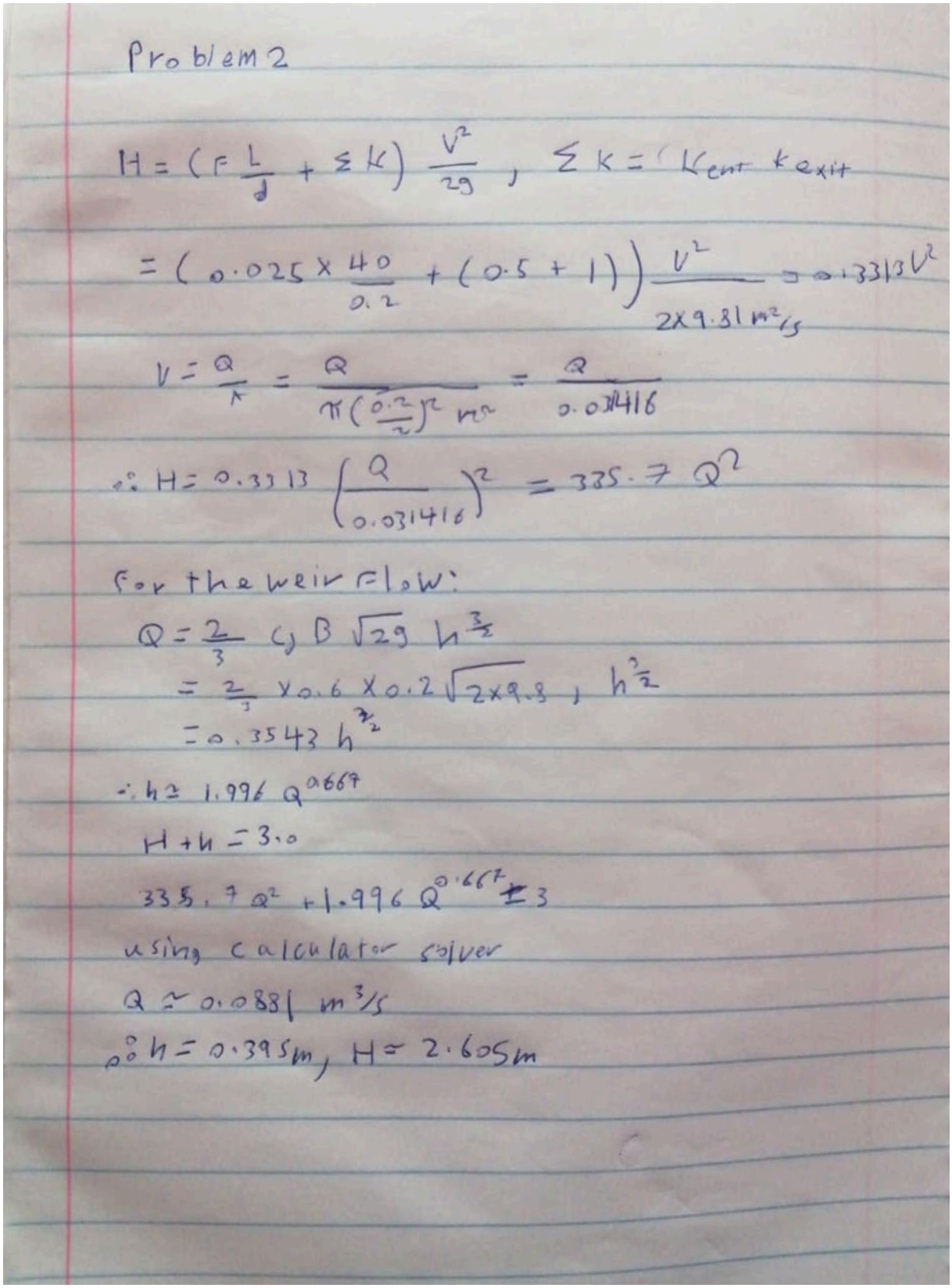
1 Problem 1

https://docs.google.com/spreadsheets/d/1vhmHeIKQm5cyJVqDlUw45caC6Ybm83kUXW3qFd-Pc8g/edit?gid=0#gid=0

2 Problem 2



Problem 2

$H = \left(f\frac{L}{d} + \Sigma K\right)\frac{V^2}{2g}$, $\Sigma K = K_{ent} + K_{exit}$

$= \left(0.025 \times \frac{40}{0.2} + (0.5 + 1)\right)\frac{V^2}{2 \times 9.81\ m^2/s} = 0.3313 V^2$

$V = \frac{Q}{A} = \frac{Q}{\pi(\frac{0.2}{2})^2\ m^2} = \frac{Q}{0.031416}$

$\therefore H = 0.3313\left(\frac{Q}{0.031416}\right)^2 = 335.7\ Q^2$

For the weir flow:

$Q = \frac{2}{3} C_d B \sqrt{2g}\, h^{\frac{3}{2}}$

$= \frac{2}{3} \times 0.6 \times 0.2\sqrt{2 \times 9.8}\, h^{\frac{3}{2}}$

$= 0.3543\, h^{\frac{3}{2}}$

$\therefore h = 1.996\, Q^{0.667}$

$H + h = 3.0$

$335.7\, Q^2 + 1.996\, Q^{0.667} = 3$

using calculator solver

$Q \simeq 0.0881\ m^3/s$

$\therefore h = 0.395 m$, $H = 2.605 m$

3 Problem 3

https://colab.research.google.com/drive/1qTFmmr5jIOO7sJlrA6cjPXEmkK7Dse5A#scrollTo=xn1PmzsW9y6Y