ENGR 207 Assignment 6

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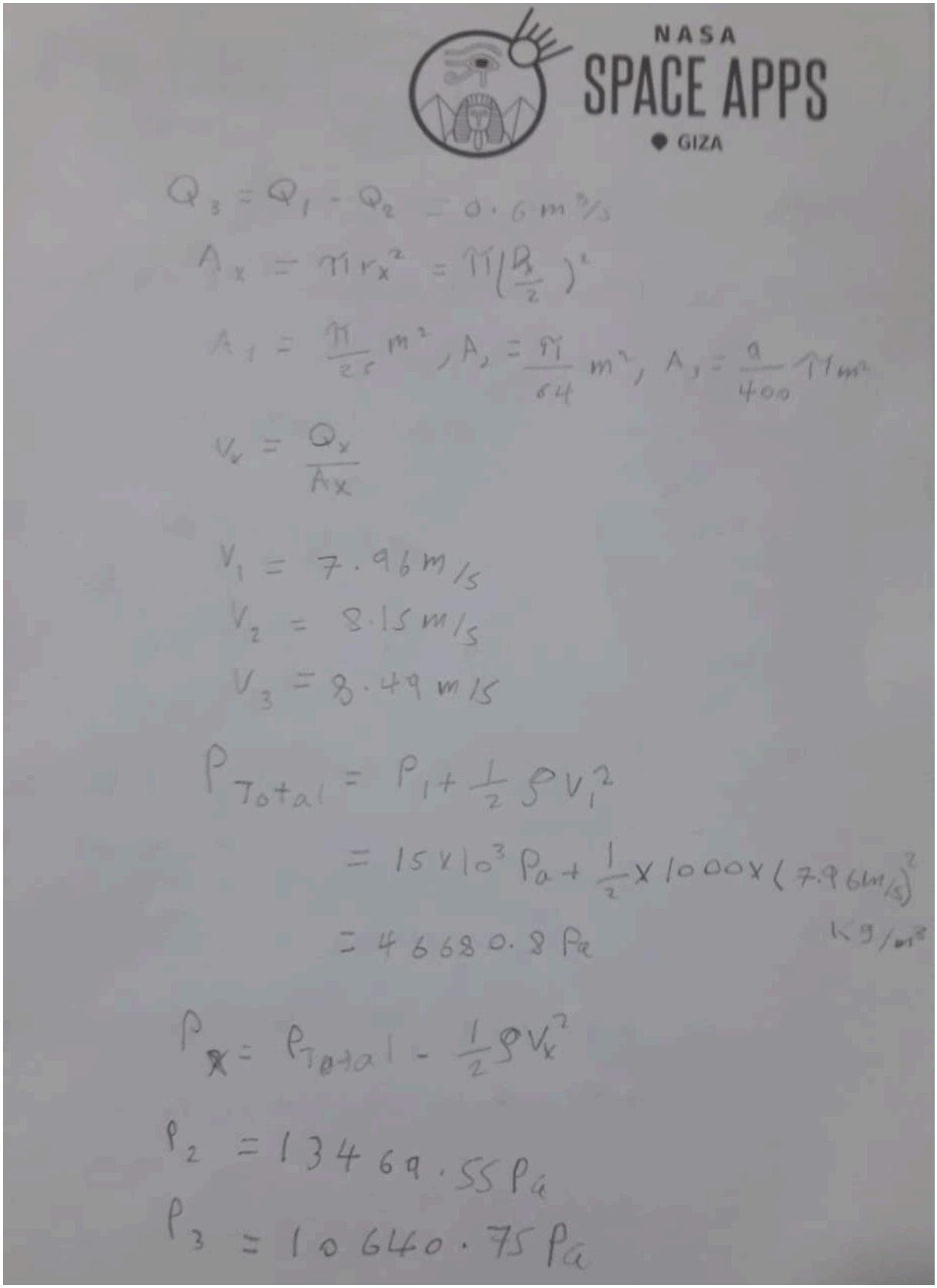
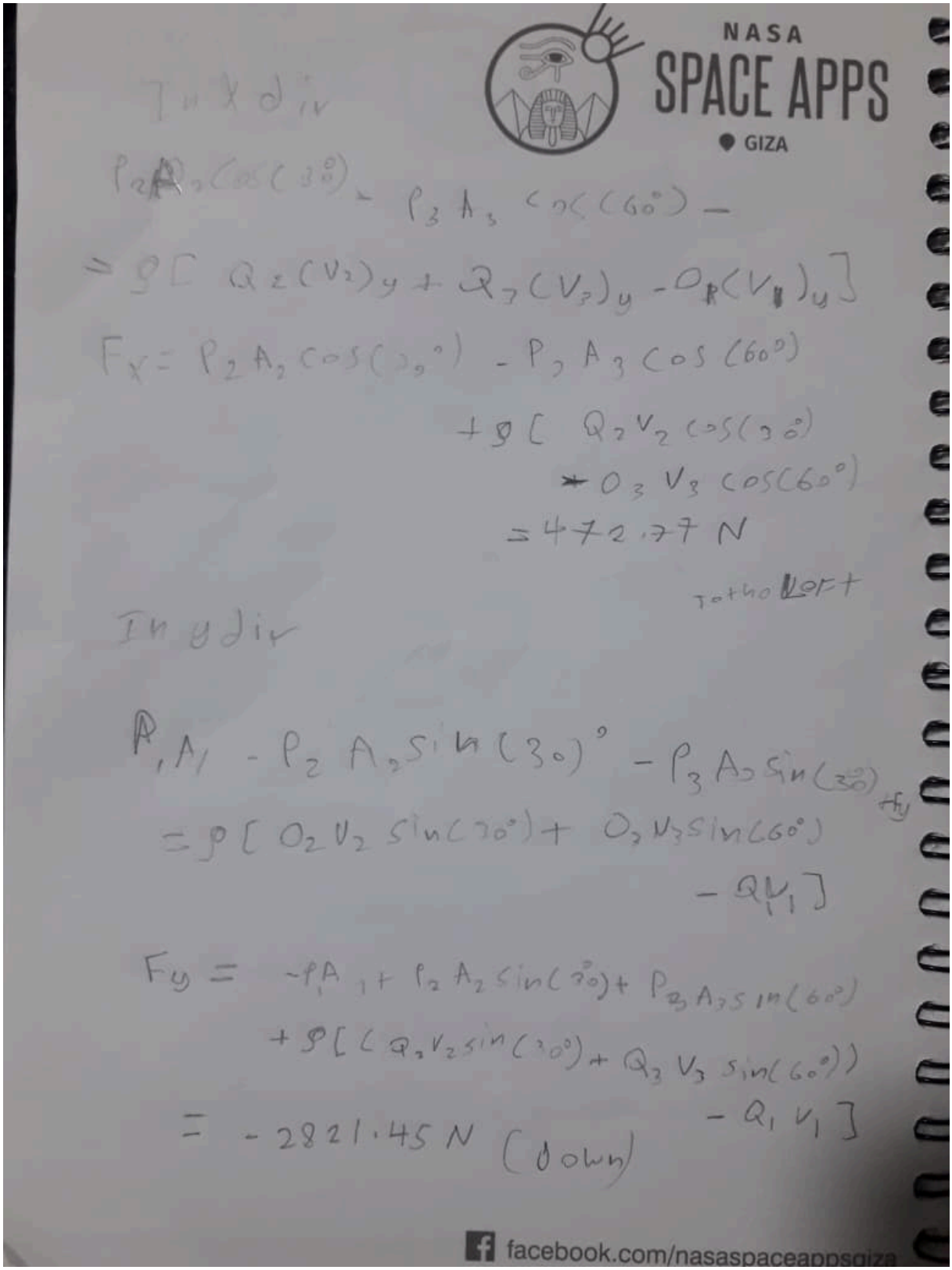
Contents

1 Problem 1

https://docs.google.com/spreadsheets/d/1g2M_AvuD9kicooPL13IoDsFwwXcL_7A_LkSdNSoZ45E/edit?gid=0#gid=0

2 Problem 2


NASA
SPACE APPS
GIZA
$Q_3 = Q_1 - Q_2 = 0.6\ m^3/s$
$A_x = \pi r_x^2 = \pi(\frac{D_x}{2})^2$
$A_1 = \frac{\pi}{25}\ m^2$, $A_2 = \frac{\pi}{64}\ m^2$, $A_3 = \frac{9}{400}\pi\ m^2$
$V_x = \frac{Q_x}{A_x}$
$V_1 = 7.96\ m/s$
$V_2 = 8.15\ m/s$
$V_3 = 8.49\ m/s$
$P_{Total} = P_1 + \frac{1}{2}\rho V_1^2$
$= 15 \times 10^3\ Pa + \frac{1}{2} \times 1000 \times (7.96\ m/s)^2$
$= 46680.8\ Pa$
kg/m^3
$P_x = P_{Total} - \frac{1}{2}\rho V_x^2$
$P_2 = 13469.55\ Pa$
$P_3 = 10640.75\ Pa$


NASA
SPACE APPS
GIZA
In x dir
$P_2A_2\cos(30^\circ) - P_3A_3\cos(60^\circ) -$
$= \rho[Q_2(V_2)_y + Q_3(V_3)_y - Q_R(V_R)_y]$
$F_x = P_2A_2\cos(30^\circ) - P_3A_3\cos(60^\circ)$
$+\rho[Q_2V_2\cos(30^\circ)$
$+ Q_3V_3\cos(60^\circ)$
$= 472.77\ N$
To the Right
In y dir
$P_1A_1 - P_2A_2\sin(30)^\circ - P_3A_3\sin(30^\circ)$
$= \rho[Q_2V_2\sin(30^\circ) + Q_3V_3\sin(60^\circ)$
$- QV_1]$
$F_y = -P_1A_1 + P_2A_2\sin(30^\circ) + P_3A_3\sin(60^\circ)$
$+\rho[(Q_2V_2\sin(30^\circ) + Q_3V_3\sin(60^\circ))$
$- Q_1V_1]$
$= -2821.45\ N$ (down)
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3 Problem 3

https://colab.research.google.com/drive/1S3_03NMELeaObMgQJAZZkYcsh_66Yl7z?usp=sharing