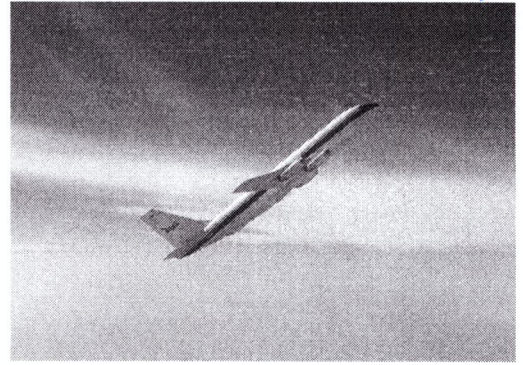# Height of a Zero Gravity Parabolic Flight

Math 1010 Intermediate Algebra Group Project

Your Name: _Aymoa Rincon_   9:00 am

Have you ever wondered what it might feel like to float
weightless in space? One way to try it out is to fly on a special
aircraft that astronauts use to train for their trips to space.
Both NASA and the Russian Space Agency have been flying
these for years. The way this is accomplished is to fly to a high
altitude, drop down to gain speed, and then start a large
parabolic path up in the sky. For a time ranging from 10 to 20 seconds, along the top part of the
parabolic flight, an environment simulating zero gravity is created within the plane. This effect can
cause some nausea in the participants, giving rise to the name "Vomit Comet", the plane used by NASA
for zero-G parabolic training flights. Currently there is a private company that will sell you a zero-G ride,
though it is a bit expensive, around $5000.

This lab will have you take a look at the parabolic path to try to determine the maximum altitude the
plane reaches. First, you will work with data given about the parabola to come up with a quadratic
model for the flight. Then you will work to find the maximum value of the model. Now for the data:

Height of a Zero-G Flight t Seconds After Starting a Parabolic Flight Path

X Time t in seconds	3	10	20
f(x) Height h in feet	21,768	22,440	20,680

$(3, 21768)$ $(10, 22440)$ $(20, 20680)$

To find the quadratic model, you will be plugging the data into the model $h = at^2 + bt + c$.
The data points given are just like x and y values, where the x value is the time t in seconds and
the y value is the altitude h in feet. Plug these into the model and you will get equations with a,
b and c.

Part 1: Write your 3 by 3 system of equations for a, b, and c.

$21768 = 9a + 3b + c$

$22440 = 100a + 10b + c$

$20680 = 400a + 20b + c$