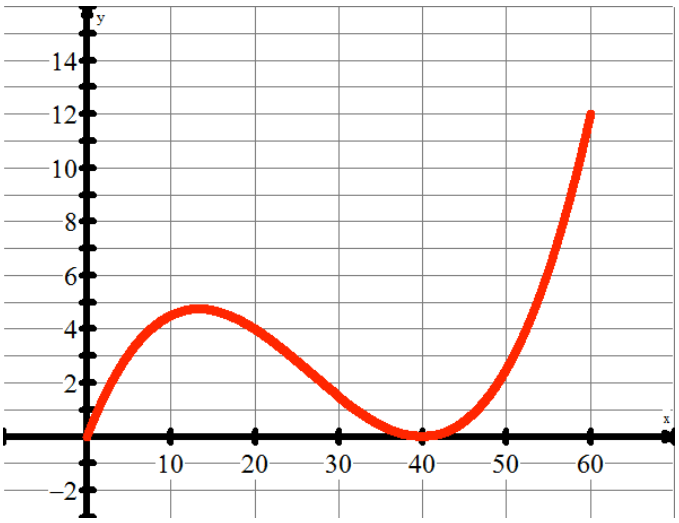
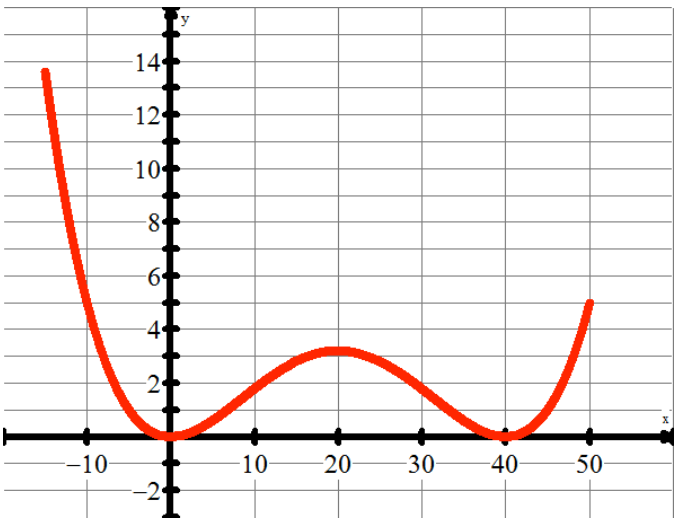
Polynomial Modeling – Designing Roller Coasters

Your design team has the following "profile" of part of a roller coaster (the x-axis represents horizontal distance and the y-axis represents vertical distance). Your initial task is to find a polynomial model for the profile of the roller coaster.



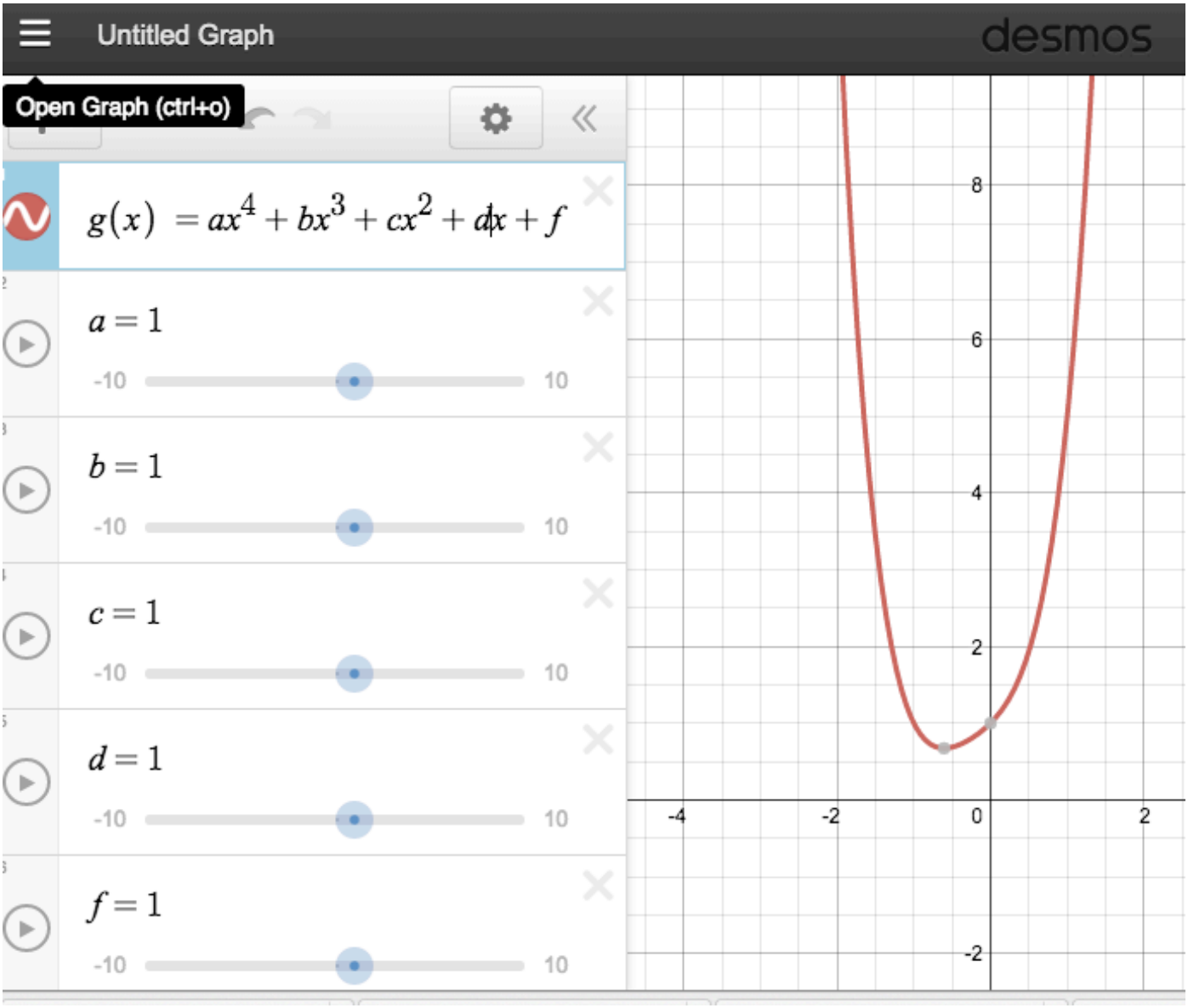


You will carry out this modeling in three ways:

(a) Using DESMOS, program in the standard form of a cubic equation ($y = ax^3 + bx^2 + cx + d$) or quartic ($y = ax^4 + bx^3 + cx^2 + dx + g$) and add sliders for values of a,b,c,d and g. Then adjust the sliders to get an equation that matches this "profile" pictured here. (see picture on second page below for setting up sliders)

(b) Use the graph to read data points from the graph, then your TI-84 to determine the equation (cubicreg/quartreg)

(c) (NO CALCULATORS) Use algebra & skills you've learned from your Quadratics Unit to determine an equation.


Untitled Graph
desmos
Open Graph (ctrl+o)
$g(x) = ax^4 + bx^3 + cx^2 + dx + f$
$a = 1$
$b = 1$
$c = 1$
$d = 1$
$f = 1$
-10
10
8
6
4
2
-4
-2
0
2
-2