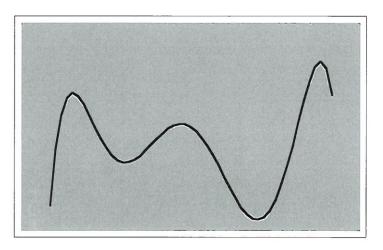


Polynomial Roller Coasters

The shape of a roller coaster could be modeled by a polynomial function, such as this one:

$$y = ax^{6} + bx^{5} + cx^{4} + dx^{3} + ex^{2} + fx + g.$$

Here is an example:



$$y = -.015x^{6} + .01x^{5} + 14x^{4} + 20x^{3} - 3000x^{2} - 10000x + 300000.$$

(Domain: $-25 \le x \le 25$)

Use a graphing calculator or spreadsheet program to investigate the effects of the coefficients on the shape of the roller coaster, as follows:

1. Change the "f" coefficient from "-10,000" to "-20,000." What is the effect on the roller coaster? Why?

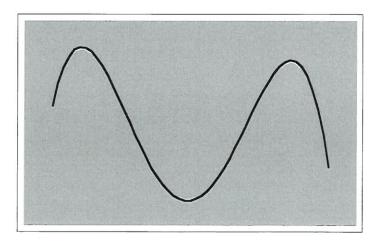
2. What do you think would happen if you changed "f'' to "-30,000"? Try it and explain what happened.

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What happens if you change "f" to "O"? Explain.
Change all coefficients to "O" except for "d" (leave it at "20"). Describe the result.
Now change "d" to "-20" (leaving all other coefficients equal to zero), and create the graph. Explain the results.
Leave $d = -20$, and change "f" from "0" to "10000." Try several other values of "f", to see the effect. Describe the results.

7. Set "a" and "b" equal to zero, and see if you can find values for the other coefficients that produce a graph of this shape:



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