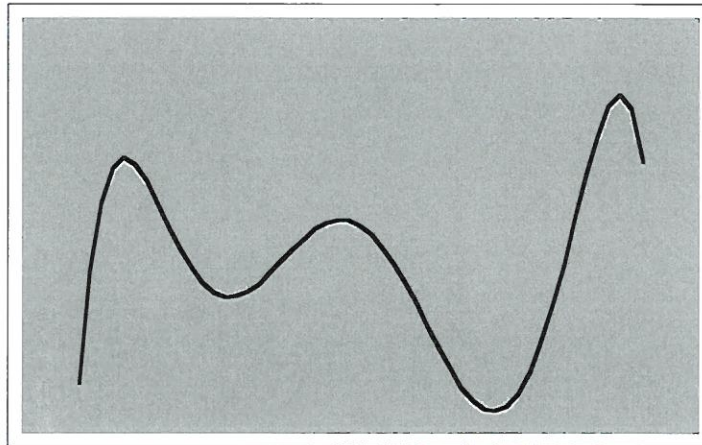


Polynomial Roller Coasters

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: $-25 \leq x \leq 25$)

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.

3. What happens if you change " f " to "0"? Explain.

4. Change all coefficients to "0" except for " d " (leave it at "20"). Describe the result.

5. Now change " d " to "-20" (leaving all other coefficients equal to zero), and create the graph. Explain the results.

6. 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:

