Graph Features

The Graph Features mathlet allows you to choose the coefficients of a degree three polynomial and then illustrates where the graph of that polynomial is rising (increasing), falling (decreasing), concave and convex.

Find coefficient values a, b, c and d for a polynomial function:

$$f(x) = ax^3 + bx^2 + cx + d$$

whose graph is:

- convex (smile shaped) for $x < 2$
- concave (frown shaped) for $x > 2$
- falling when $x < 1$
- rising when $1 < x < 3$
- falling when $x > 3$.

Can you find two different polynomials that satisfy these requirements? Why or why not?

Bonus: Make up a problem similar to this one for a friend to solve.

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