Aging Workers *The number of millions of Americans who are working full time at selected ages from 27 to 62 can be modeled by the cubic function* $f(x) = -0.000362x^3 + 0.0401x^2 - 1.39x + 21.7$, *where* x *is their age. (Source: Wall Street Journal, June 18, 2012)*[1]
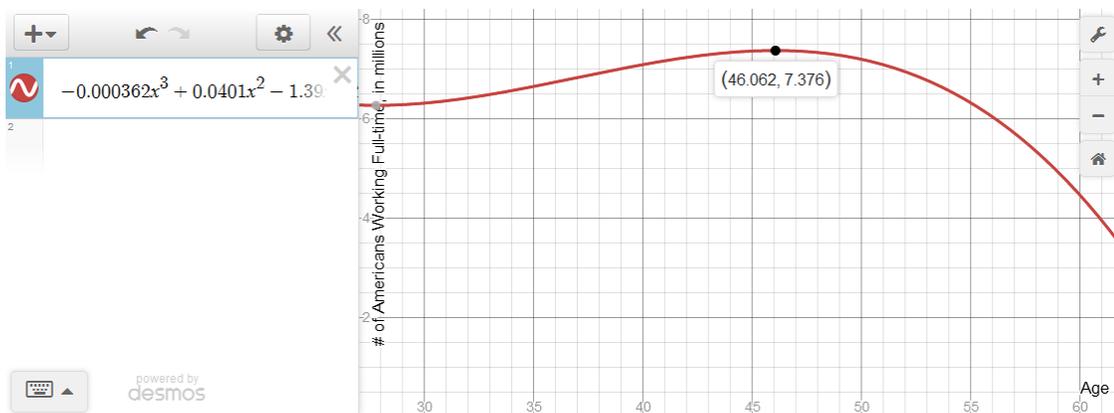
a. *Use the model to predict the number of Americans age 50 who are working full time.*

We are interested in Americans who are age 50 so we let $x = 50$ and solve for f, the number of millions of 50-year-old Americans who are working full time.

$$f(x) = -0.000362x^3 + 0.0401x^2 - 1.39x + 21.7$$
$$f(50) = -0.000362(50)^3 + 0.0401(50)^2 - 1.39(50) + 21.7$$
$$= 7.2$$

According to the model there are 7.2 million 50-year-old Americans working full time.

b. *Use technology to find the local maximum on the interval* $[27, 62]$. *What does this point indicate?*

A local maximum is a point where a curve changes from increasing to decreasing. That is, as we move from left to right along the graph, the graph changes from going uphill to going downhill.

On this graph, the local maximum occurs at the point $(46.062, 7.375)$. This point, given in the form (age, millions of full-time workers), indicates that 46-year-olds make up the greatest number of Americans (age 27 to 62) who are working full time, approximately 7.4 million.

c. *Find the local minimum on the interval* $[27, 62]$. *What does this point indicate?*
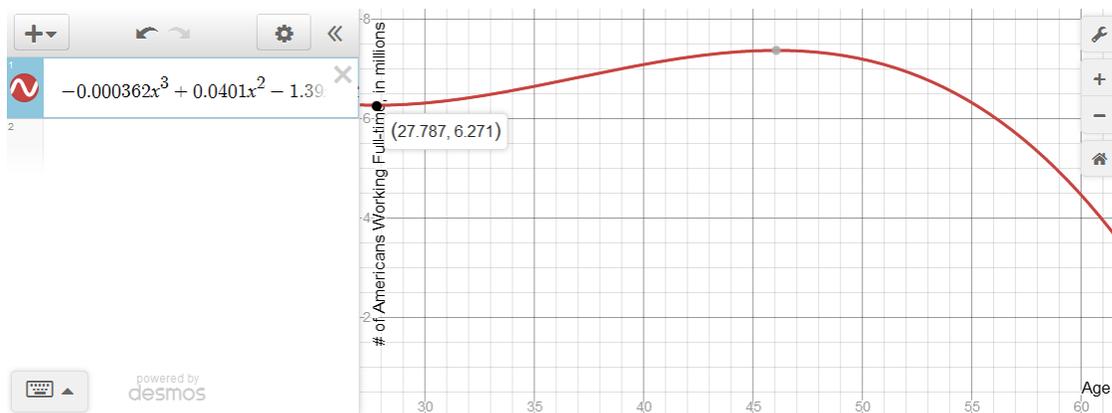
A local minimum is a point where a curve changes from decreasing to increasing. That is, as we move from left to right along the graph, the graph changes from going downhill to going uphill.

Take a look at the graph on the next page...

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[1]Harshbarger/Yocco, *College Algebra In Context, 5e*, p. 439, #46.

The local minimum occurs at the point $(27.787, 6.271)$. This point, given in the form (age, millions of full-time workers), indicates that 27-year-olds make up approximately 6.3 million of the number of Americans (age 27 to 62) who are working full time.

Notice how at this point, the graph changes from decreasing to increasing: a requirement of a local minimum. While this is the only local minimum in the interval, it is not the most minimum point. There are less full-time workers age 55 and older.