

Answer on Question #76594 – Math – Algebra

Question

Using computer technology (www.desmos.com or other mathematics graphing website) attach a graph of the parabola at midnight on the x-y axis keeping Des Moines at the origin and label the location of Columbus, Memphis, and Louisville on the graph. (Points may be added by hand to the computer generated graph).

Columbus, Ohio is 550 miles east and 80 miles south of Des Moines;

Memphis, Tennessee is 190 miles east and 430 miles south of Des Moines; and

Louisville, Kentucky is 420 miles east and 230 miles south of Des Moines.

a) For each of the above cities, state whether, by midnight, the city has already been affected by the front, is just about to be affected by the front, or has not yet been affected by the front.

b) How are your conclusions supported by the graph you drew in Step 5.

c) Support your conclusions using algebraic methods

Solution

Suppose that the vertex of the front is Des Moines (0,0)

Each unit represents 100 miles. So, Columbus (Ohio) is located at (5.5,-0.8), Memphis (Tennessee) at (1.9,-4.3) and Louisville (Kentucky) at (4.2,-2.3)

In order to answer the question “For each of the above cities, state whether, by midnight, the city has already been affected by the front, is just about to be affected by the front, or has not yet been affected by the front”, we must know the direction of movement of the front and the speed at which the front moves.

For example, if the front is moving south, the cities will be affected by the front in different time:

When the vertex of the front has moved the 800 miles south, the front will reach Columbus (Ohio) at (5.5,-0.8). The function will be:

$$f(x) = x^2 - 8$$

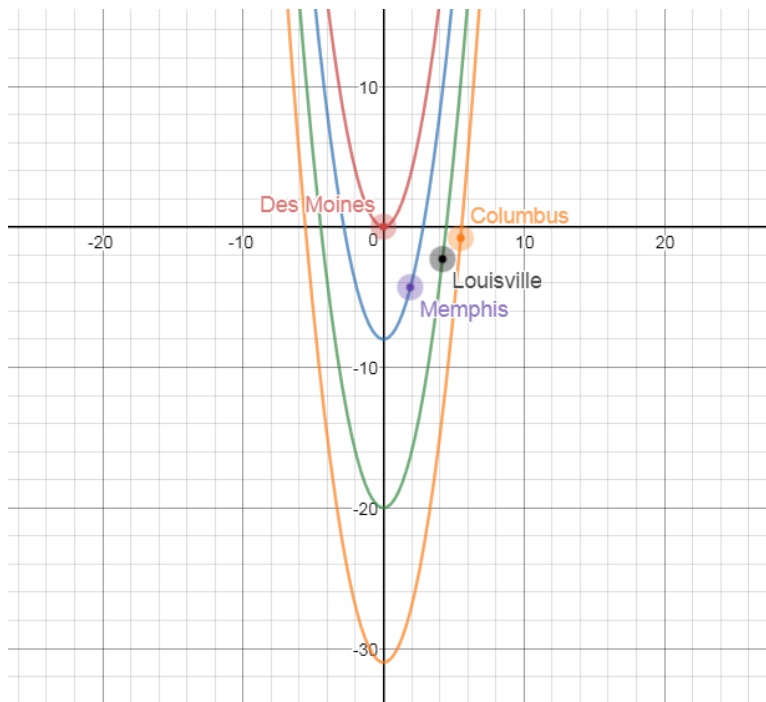
When the vertex of the front has moved the 2000 miles south, the front will reach Memphis (Tennessee) at (1.9,-4.3). The function will be:

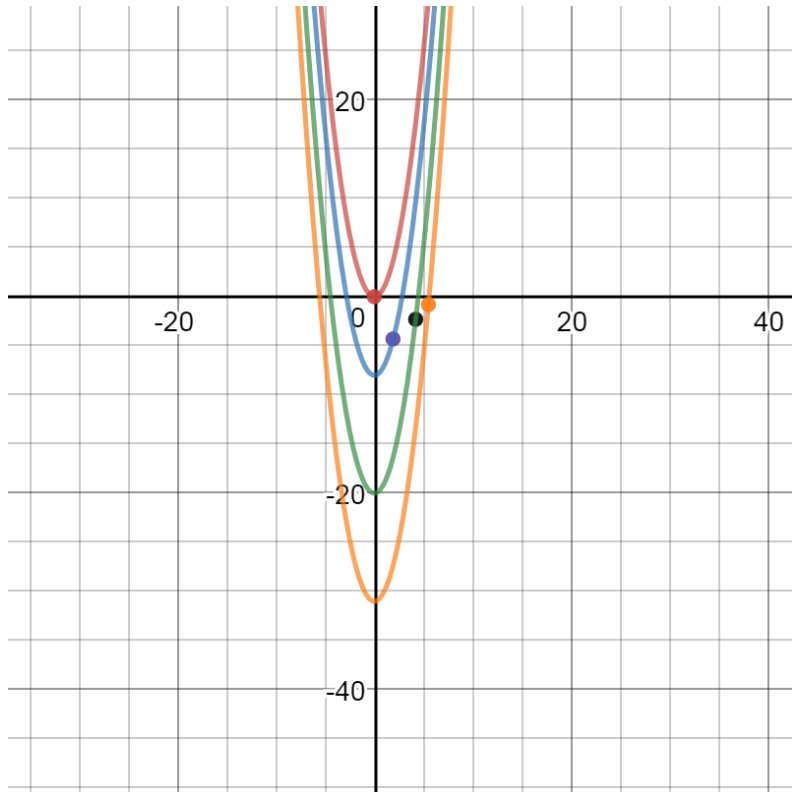
$$f(x) = x^2 - 20$$

When the vertex of the front has moved the 3100 miles south, the front will reach Louisville (Kentucky) at (4.2,-2.3). The function will be:

$$f(x) = x^2 - 31$$

So let's take a look at the possible images of the front on the graph.





Answer provided by <https://www.AssignmentExpert.com>