MA 110 PRACTICE FOR QUIZ 2

SECTION (2.3)

NAME Solutions SCORE: _____

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The research department in a company that manufactures AM/FM clock radios established the following functions:

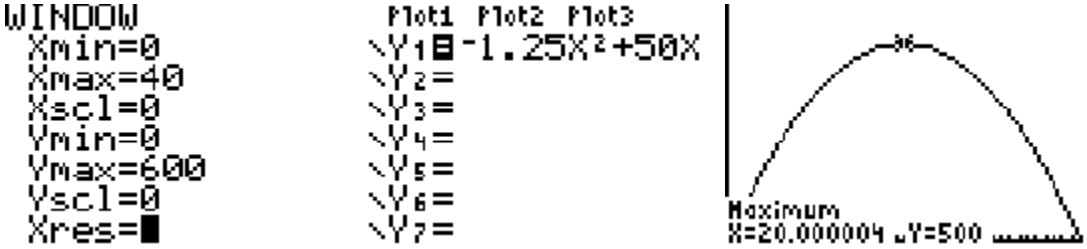
Revenue: $R(x) = -1.25x^2 + 50x$ and Cost: $C(x) = 160 + 10x$

where x, $0 \leq x \leq 40$, is in thousands, and R(x) and C(x) are in thousands of dollars.

A. What is the production level of radios (to the nearest thousand) at which the company would reach its maximum revenue level.

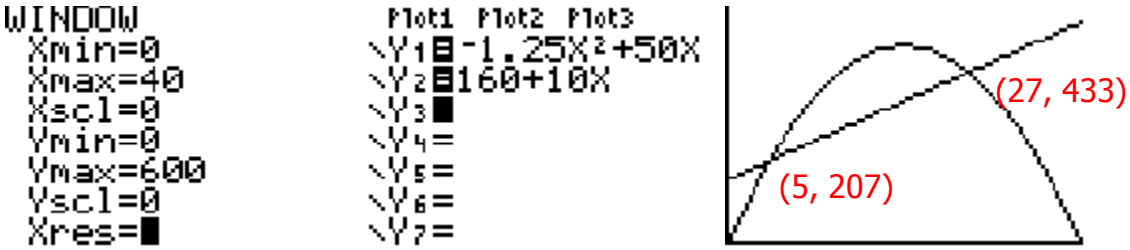
Using the revenue equation: $R(x) = -1.25x^2 + 50x$, I applied the x = -b/2a formula for finding the x-coordinate of the vertex (that is where the maximum revenue will occur). a = -1.25 and b = 50, so x = –b/2a = -50/(2*-1.25) = 20, 20 thousand radios

If I want to find this value using a graph, I need to determine the y_{max} for my window. $X_{min} = 0$ and $x_{max} = 40$ (these are given by $0 \leq x \leq 40$ from above), the $y_{min} = 0$. To find a reasonable y_{max}, pick a value of x between 0 & 40. I will use x = 20, for $R(x) = -1.25x^2 + 50x$, $R(20) = -1.25(20)^2 + 50(20) = 500$. I will use $y_{max} = 600$



If using calculator, state window size and answer x = 20 thousand radios.
Either way the result is: The company must produce 20,000 radios to achieve its maximum revenue.

B. Find the production level(s) of radios (to the nearest thousand) at which the company has break-even point(s). Sketch a simple graph and indicate your answers on the graph.



Use 5:intersect to find the values. State your window settings, sketch a graph (like above) and state: The company must produce 5,000 or 27,000 radios to break-even.

C. Will the company make a profit or a loss if it manufactures and sells 12,000 radios? Explain.

They will make a profit since 12,000 is in between the break-even production levels of 5,000 and 27,000. The revenue for 12,000 radios is greater than the cost.