Math 371 ASSIGNMENT 12, WINTER 2016 **Due at the start of class on 2/11.**

The Acme Company makes Whirlygigs. The revenue and cost functions for Whirlygigs are

$$R(x) = -0.014x^2 + 42x \qquad \text{and} \qquad C(x) = 7.6x + 4800\,,$$

where x is the number of Whirlygigs produced and sold, and R and C are the revenue and cost, respectively, in dollars.

For the following exercises,

- round all Whirlygigs to whole Whirlygigs - in some cases you may need to round in a way that is not consistent with the normal rules of rounding
- round revenue and cost to the nearest dollar
- show *CLEARLY* how your answers are obtained
- conclude each exercise with a "question and answer sentence"

1. Determine the maximum revenue, and the number of Whirlygigs that must be sold to obtain it.
2. What is the minimum number of Whirlygigs that Acme must make and sell in order to break even?

There are more on the back.

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3. If Acme makes too many Whirlygigs they will lose money. What is the maximum number of Whirlygigs that they make and sell before they start losing money? (The work you did for the previous exercise should suffice for obtaining the answer to this.)

4. The **marginal cost** is the cost for producing each additional Whirlygig. What is the marginal cost? **Give your answer in dollars, to the nearest cent.**

5. Unlike the marginal cost, the **marginal revenue** changes depending on the number of Whirlygigs. Determine the marginal revenue for the 400th and 1200th Whirlygigs. **Give your answers in dollars, to the nearest cent.**

6. The profit function is the revenue minus the cost, and we will denote it by $P(x)$. Give the profit function. (No sentence needed here.)

7. Determine the maximum profit, and the number of Whirlygigs that must be made and sold to get it.

8. Determine how many Whirlygigs must be made and sold to have profits of at least $10,000.

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