Math Xa Fall 2003

Lab 4: Modeling with Linear Functions

October 14, 2003

Name _____

Section Instructor _____

Collaborators _____

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Thomas Wolfe was an author born in Asheville, North Carolina, in 1900. His first novel, *Look Homeward Angel*, was a thinly veiled fiction that gave such scathingly accurate portrayals of well-known townspeople that despite the novel's enthusiastic reception nationwide, Wolfe felt he received a cool welcome in his hometown. He proceeded to write *You Can't Go Home Again*. The problem you are asked to consider involves one of Wolfe's lesser-known novels.

In lieu of a straight royalty percentage on sales of his book, *The Story of a Novel*, Thomas Wolfe agreed to accept a sliding scale of 10% on the first 3000 copies sold, 12.5% on the next 4500 copies, and 15% on all copies after that. The book was priced at $1.50. (Elizabeth Nowell, *Thomas Wolfe: A Biography*, Doubleday, Garden City, NY, 1960.)

1. Write a function $R(x)$ that gives Wolfe's royalties as a function of x, the number of books sold. You will have to write a formula in pieces, because the formula varies depending upon the number sold. Make sure your formula works as you want it to by checking it out on some concrete cases. Does your formula work if Wolfe sells 3001 copies? 7501 copies?

2. Graph $R(x)$.

3. Solve $R(x) = 1000$. What does this equation mean in terms of copies sold and royalties?

4. Graph $R'(x)$, where $R'(x)$ is the slope function – giving the slope at every point on the graph R.

5. What is the practical meaning of $R'(x)$? Include units in your answer.