1. (18 points) The first and only edition of a certain calculus book came out in 1994. A partial publisher's record reflecting the price p, in dollars, of the book t years after it was first published is given below.

t	0	2	4	6	8
p	67	61	54	46	37

(Assume p and its derivative are differentiable functions.)

(a) (5 pts.) Use the data to estimate $p'(6)$. Show your work; include units.

- $p'(6) \simeq \left(\dfrac{37 - 46}{2} + \dfrac{46 - 54}{2} \right) \dfrac{1}{2} = \left(\dfrac{-9}{2} + (-4) \right) \dfrac{1}{2} = -4.25$ dollars per year.

(b) (4 pts.) Use your answers from part (a) to give a practical interpretation of $p'(6)$. You should only use everyday language that a non-calculus student would understand.

In 2000 the price of the book was dropping by about 4 dollars and 25 cents per year.

(c) (3 pts.) You somehow find out that $p'(8) = -5.25$. What is the most reasonable estimate of the price of the book in 2003? Show brief work.

- $p(9) \simeq 37 - 5.25 = 31.75$ dollars.

So the book was about 31 dollars and 75 cents in 2003.

(d) Just below the table given above the publisher has scribbled "$p''(t) > 0$."

   (i) (3 pts.) Based on the table's data, is it likely that the publisher's scribbled assertion is correct? *Please circle* Yes *or* No *below <u>and</u> briefly explain.*

        YES   NO

    According to the table's date the price function is concave down.

   (ii) (3 pts.) Assuming the publisher <u>is</u> correct, what would the publisher's assertion tell a *non calculus expert* about the price of the book during the 8 years following its publication? *Please circle your choice.*

    (A) The function p was concave up during the 8 year period following the book's publication.

    (B) The function p decreased at an increasing rate during the 8 years that followed the book's publication.

    (C) The book was cheapest sometime around 1999.

    (D) The book's price dropped fast at first, then slower and slower toward the end of the 8 year-period.