

2. (20 points) Use the graphs shown below to answer the questions. Where you are asked to find an interval $\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$, give the most comprehensive interval possible (for example, it is not good enough to say that f is increasing for $1 < x < 2$). Your answers should be correct to one decimal place.
- In the graph on the right clearly indicate which is the graph of f' and which is the graph of f'' .
 - f is concave down for $\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$.
 - f is increasing at a decreasing rate for $\underline{\hspace{1cm}} < x < \underline{\hspace{1cm}}$.
 - f has its steepest positive slope at $x = \underline{\hspace{1cm}}$.
3. (15 points) At a production level $q = 100$ ounces of perfume, the cost is $C(100) = \$5000$ and the marginal cost is $C'(100) = 25$ (fill in the units). Give the best possible estimate based on this information for the cost of producing 104 ounces. If we also know that $C''(100) = -5$, is this estimate an over- or under-estimate of the true cost; explain how you know (graphically might be best).

4. (20 points) Deep in Hundred Acre Wood , it has been raining and Pooh Bear has recorded the rate $r(t)$ in inches per hour, every so often. Estimate the total amount of rain that has fallen from 7 til 10 am. This information is important to Piglet, so give the best possible estimate based on the data; that is, give an underestimate and an overestimate, and their average. Be careful! The lower rate might not appear consistently at the beginning or the end of each time period, and the time periods (in hours) are not always the same. Give all your answers to **two** decimal places: underestimate _____ , overestimate _____ , average _____ inches.

Δt						
t	7 : 00	8 : 00	8 : 30	9 : 00	9 : 30	10 : 00
$r(t)$	0.4	0.5	0.6	1.2	2.6	2.2

5. (15 points) Consider the cost and revenue functions shown below. **Give explanations in terms of marginal cost and revenue.**
- a. For which production levels is there a (positive) profit?

 - b. Suppose the current production level is $q = 300$ items. Will production of an addition item increase or decrease the profit? Explain!

c. At what production level is the maximum profit achieved? Explain!