

Math 61 Learning Unit 4 Hand-In Assignment for Section 4.1..

1. The number of network managers in the U.S. over the years 1989–2001 followed the curve

$$N(t) = 2t^2 - 37t + 380 \text{ thousand managers } (9 \leq t \leq 21)$$

where t is time in years since the start of 1980.

- a. Calculate $N'(t)$ and use it to estimate at what rate was the number of network managers changing at the start of 1997.
- b. What are the units of measurement of the answer in part (a)?
- c. The answer to part (a) suggest that (pick one *and explain your choice; no explanation, no credit*):
 - A. The rate of change of the number of managers was decreasing during 1989–2001.
 - B. The rate of change of the number of managers increased, then decreased during 1989–2001.
 - C. The rate of change of the number of managers decreased, then increased during 1989–2001.
 - D. The rate of change of the number of managers was increasing during 1989–2001.
 - E. The rate of change of the number of managers was constant during 1989–2001.

2. The demand for *Gauss Jordan* sneakers is given by

$$q = \frac{6,000,000}{p^{1.1}},$$

where p is the price in dollars per pair and q measures the monthly sales of the sneakers at the *Finite Math Sports Shop*.

- a. Calculate $\frac{dq}{dp}$ and also its value at $p = 100$.
- b. What does the answer tell you about sales of the sneakers? (be explicit and precise; use the actual answer and don't just talk in vague terms.)

3. The annual profit of the *Chebyshev* fur hat factory depends on the number n of workers according to the formula

$$P(n) = -7n + 120\sqrt{n} + 130 \text{ in thousands of } \text{€},$$

Where n is the number of workers at its Siberia plant.

- a. Calculate $P'(n)$ and $P'(85)$. *Interpret the second answer; that is, what does it say about the profits at the Chebyshev company?*
- b. For which value of n , to the nearest whole number, is $P'(n)$ zero?
- c. The above answers tell you that, at an employment level of 68 workers: (pick one *and explain your choice; no explanation, no credit*)

- A. The profit is decreasing at a rate of more than €490 per additional worker employed.
- B. The profit is increasing at a rate of more than €490 per additional worker employed.
- C. The profit is at its minimum level.
- D. The profit can be increased by employing more workers.
- E. The profit is at its maximum level.
- F. The profit can be increased by employing fewer workers.

4. Do Exercise 102 in Section 4.1 of the textbook.

5. Following is an excerpt from your own graded homework:

$$x^n = nx^{n-1} \quad \textcolor{red}{\times \text{ WRONG! } -10}$$

Why was it marked wrong? How would you correct it?

[Hint: This is 4.1 Exercise 110 in the book.](#)

6. Following is an excerpt from your second worst enemy's graded homework:

$$f(x) = \frac{3}{4x}; f'(x) = \frac{0}{4} = 0 \quad \textcolor{red}{\times \text{ WRONG! } -10}$$

Why was it marked wrong? How would you correct it?

[Hint: This is 4.1 Exercise 114 in the book.](#)