

## Chapter 2

- 2.5** Have a graphical understanding of  $f(x)$ ,  $f'(x)$ , and  $f''(x)$ . Graph a function which is increasing (or decreasing) at an increasing, decreasing, or constant rate. Look at a graph or table of values for  $f(x)$  and answer questions about  $f(x)$ ,  $f'(x)$  or  $f''(x)$ . Look at #1, 2, 3, 4, 5, 8, 15, 16 from 2.5.
- 2.6** Given a cost function and a revenue function, be able to compute marginal cost, marginal revenue, and profit. Know the connection between maximum profit and these marginal quantities. Know the practical meaning of these marginal quantities. Look at #1, 2, 3, 6, 9, 10, 11, 12, 13 from section 2.6. Also look at #16, 17, 21ab from section 5.3.

## Chapter 4 (sections 1–4)

Know what the derivative means and know how to apply this to problems like the following (or like those from chapter 2):

- Given a formula for some quantity, find the rate at which that quantity is changing. Look at #27, 36, 37 from 4.1, #27, 30, 37 from 4.2, #35, 37 from 4.3, #29 from 4.4.
- Sketch the graph of  $f(x) = \text{some formula}$ . Find the slope of this curve at any given point. Look at #22 from 4.1.
- The cost (or revenue) function for some item is given by *some formula*. Find a formula for the marginal cost (or revenue). For a particular value of  $q$ , explain what this means in practical terms. Look at #34 from 4.1, #34 from 4.3.
- The position of an object is given by *some formula*. Find a formula for the velocity of that object and answer questions about the position and velocity of the object. Look at #43 from 4.1.

## Chapter 3

- 3.1** Given a graph, formula, or table of values for the rate of change of some quantity, approximate the total change in that quantity. If the graph for this rate of change is always increasing or if it is always decreasing, then you should be able to determine whether your approximation is an underestimate or overestimate to the exact total change. Averaging the left sum and right sum will usually give you a better approximation, but you may lose information about whether or not you have an underestimate or overestimate. Look at #3,4,5,6,7,8,9 from section 3.1.

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## Chapter 4 (sections 1–4)

Given a formula for a function, be able to find a formula for the derivative of that function using the rules below. Look at #1–30 from 4.3, and #3–26 from 4.4. If necessary for review, also look back at #1–21 from 4.1, and #1–21 from 4.2.

If  $n$ ,  $m$ ,  $b$ ,  $c$ , and  $a$  are constants ( $a > 0$ ), then

- $f(x) = c \quad \implies \quad f'(x) = 0$
- $f(x) = mx + b \quad \implies \quad f'(x) = m$
- $f(x) = x^n \quad \implies \quad f'(x) = nx^{n-1}$
- $f(x) = a^x \quad \implies \quad f'(x) = \ln a \cdot a^x$
- $f(x) = e^x \quad \implies \quad f'(x) = e^x$
- $f(x) = \ln x \quad \implies \quad f'(x) = \frac{1}{x}$
- $f(x) = g(x) \pm h(x) \quad \implies \quad f'(x) = g'(x) \pm h'(x)$
- $f(x) = cg(x) \quad \implies \quad f'(x) = cg'(x)$
- **Chain Rule:**  $f(x) = g(h(x)) \quad \implies \quad f'(x) = g'(h(x)) \cdot h'(x)$
- **Product Rule:**  $f(x) = g(x) \cdot h(x) \quad \implies \quad f'(x) = g'(x) \cdot h(x) + g(x) \cdot h'(x)$
- **Quotient Rule:**  $f(x) = \frac{g(x)}{h(x)} \quad \implies \quad f'(x) = \frac{g'(x) \cdot h(x) - g(x) \cdot h'(x)}{(h(x))^2}$

### Notes

- You should bring your own calculator and use it to find the derivative of a function at a particular point. You should also be able to use its graphing and table features effectively. Once you get a good graph, you should be able to use the built-in features which allow you to find where two curves intersect, or the maximum or minimum point on a curve.
- The test will be in class on Monday, June 24, 2002.

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