What to expect on the first exam in Math 141

First of all, be sure to master all homework problems.
This includes all the homework problems up to section 3.3.
Here is the list:

Section 1.4: Page 51, Problems 17,19,21,25,29,31,33,35,37,53
Section 2.2: Page 111, Problems 1-11 odd, 17, 21
Section 2.3: Page 119, Problems 15,19,23,25
Section 2.4: Page 135, Problems 3,7,11,15,17,23,25,31
Section 2.5: Page 146, Problems 1-43 odd, 47,53,61,67
Section 2.6: Page 153, Problems 5,6,7,9,11
Section 2.7: Page 162, Problems 1-37 odd, 87
Section 2.8: Page 171, Problems 1,3,7,9,17,23,29,33,37,45,47,49,55
Section 3.1: Page 199, Problems 3,5,7,9,11,15,19,61,65
Section 3.2: Page 199, Same problems as for section 3.1 but using the 2nd derivative test
Section 3.3: Page 232, Problems 1-15 odd, 47

If you would like to work on more problems which cover the same ideas, then here is a very long list of problems from which to choose:

Section 1.4: Page 51, Problems 1-55
Section 2.2: Page 111, Problems 1-34
Section 2.3: Page 119, Problems 15,16,19,20,23,25
Section 2.4: Page 135, Problems 1-14,17-20,23-26
Section 2.5: Page 146, Problems 1-66
Section 2.6: Page 153, Problems 5-1
Section 2.7: Page 162, Problems 1-42,87-90
Section 2.8: Page 171, Problems 1-54,71-74
Section 3.1: Page 199, Problems 1-30,61,64,65
Section 3.2: Page 199, Problems 1-30 but using the 2nd derivative test
Section 3.3: Page 232, Problems 1-16

Here is a list of some concepts which may be somewhat different from the problems in the homework. You should be sure that you understand each of these concept problems.

1) State the formal, limit definition of the derivative. Explain how each piece of the definition relates to a picture.

2) Is $\frac{x^2-25}{x-5} = x + 5$? Explain your answer.

Is $\lim_{x\to5} \frac{x^2-25}{x-5} = \lim_{x\to5} x + 5$? Explain your answer.

3) Be able to find the profit equation, $P(x)$, when given the revenue equation, $R(x)$, and the cost equation, $C(x)$. Be able to explain the meanings and implications of $P(10)$ and $P'(10)$.

4) Be able to explain the first derivative test and how it is able to help you determine relative extrema.

On the next page are two further concept problems.

(10 pts.)   **8.** Every morning at summer camp, the youngest boy scout raises the flag to the top of the flagpole. Below is a graph of a function that represents this process.

↑

**height
(in feet)**

time (in seconds)   →
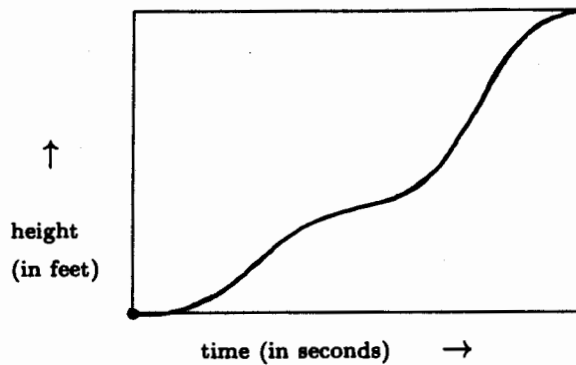
(a) Mark a point on the graph where the flag is highest. Label this point with the letter A.

(b) Mark a point on the graph where the derivative of the function is greatest. Label this point with the letter B.

(c) Explain, in terms of the flag, why you put point B where you did.

(5 pts.)   **9.** The following graph of a function $y = f(x)$ is concave up. Explain why the 2nd derivative of the function is positive. It is not sufficient just to say "because the graph is concave up".