

MATH 103 200710 Problem Set 4

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The following problems may appear on the quiz on Thursday, March 1, 2007.

1. Find the stationary points of the following functions:

(a) $f(x) = x^3 - 27x$ (b) $g(x) = -6x^3 - \frac{3}{2}x^2 + 3x - 3$ (c) $h(x) = 2x^3 + 3x^2 - 3$

2. For each of the functions in the previous question, determine whether each stationary point is a local minimum, a local maximum, or neither using the first derivative test.
3. For each of the functions in the previous two questions, find the inflection points. Also determine whether the function is concave up or down at the stationary points (i.e., use the second derivative test to determine whether the critical points are maxima or minima).
4. Graph each of the functions given in question 1, indicating all stationary points and inflection points.
5. Consider the following functions defined on the interval $x > 0$:

(a) $R(x) = \frac{12}{x} + 3x + 1$ (b) $C(x) = \frac{1}{x^2} + \frac{x}{4} - \frac{5}{4}$ (c) $P(x) = \frac{1}{\sqrt{x}} + \frac{x}{2}$

Find the x -intercepts of each of those functions. Hint: $(1, 0)$ is an x -intercept for (b).

6. For each of the functions in the previous question, find the stationary points, extreme points, and inflection points.
7. For each of the functions in the previous two questions, find the asymptotes.
8. Graph each of the functions in the previous three questions.

Please do the following problems from the textbook. They may appear on Midterm Test 2.

2.3 C-level: 1–29, 35–40; B-level: 30–34; A-level: 41–47;

2.4 C-level: 1–22; B-level: 23–27, 31–32; A-level: 28–30, 33–36.