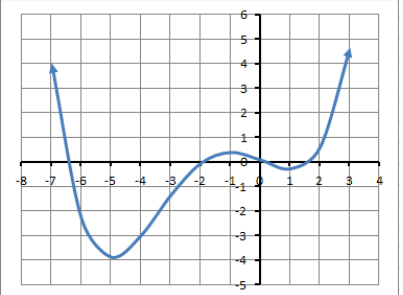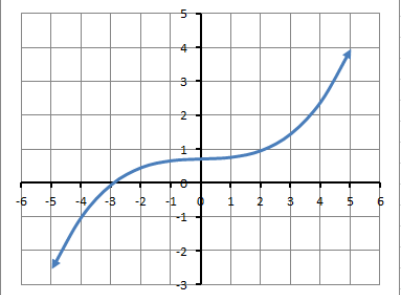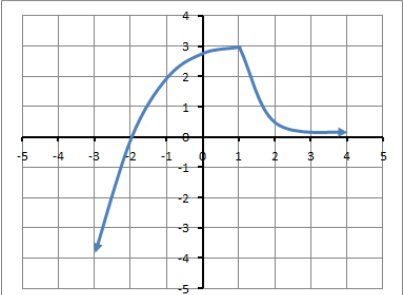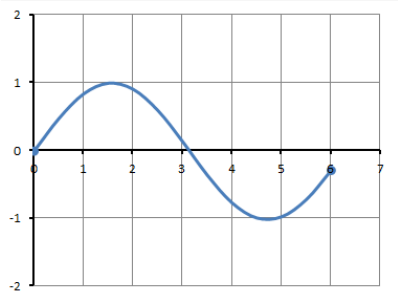Name: _____ Date: _____ Session: _____

AP Physics C Preparation Homework for Day 7

Part 1: Given the following graphs, fill in the blank cells. You may assume that there are no critical points outside of the domain shown in the graph.

	Example	Graph 1	Graph 2	Graph 3
	Note the arrows at the endpoints of the function, indicating a domain of (-∞,+∞)	Note the arrows at the endpoints of the function, indicating a domain of (-∞,+∞)	Note the arrows at the endpoints of the function, indicating a domain of (-∞,+∞)	Note the points at the endpoints of the function, indicating a domain of [0, 6]
Critical numbers	-5, -1, 1			
Critical points	(-5, -4) (-1, 0.3) (1, 0.2)			
Intervals where the function is increasing	(-5,-1) (1, +∞)			
Intervals where the function is decreasing	(-∞,-5) (-1, 1)			
Local minima	(-5, -4) (1, 0.2)			
Local maxima	(-1, 0.3)			
Global minima	(-5, -4)			
Global maxima	DNE			

Part 2: Use calculations (not graphing) to answer the following questions. These questions basically break down the steps of the first derivative test.

Problem 2A. Given the function

$$f(x) = \frac{1}{4}x^4 + \frac{5}{3}x^3 - \frac{1}{2}x^2 - 5x + 6$$

i) Find the first derivative

ii) Find the critical numbers

iii) Make a sign chart, test a value in each interval, and determine whether the function is increasing ($\uparrow$) or decreasing ($\downarrow$) on that interval.

iv) Classify each of the critical numbers as local maxima, local minima, or neither.

v) Find the coordinates of the global extremes

Problem 2B. Given the function

$$f(x) = 2\cos\left(2x + \frac{\pi}{4}\right) + 3 \qquad \text{x is in radians and has the domain } [0, 2\pi]$$

i) Find the first derivative

ii) Find the critical numbers

iii) Make a sign chart, test a value in each interval, and determine whether the function is increasing (↑) or decreasing (↓) on that interval.

iv) Classify each of the critical numbers as local maxima, local minima, or neither.

v) Find the coordinates of the global extremes