

Sample1

Math 231: Calculus 1 Final Exam 2 April 30, 2007 Class of Professor Kevin O'Bryant

*Read each question carefully, answer each question completely, and show all of your work. Write your solutions clearly and legibly; no credit will be given for illegible solutions. Remove sunglasses and brimmed hats. Turn your cell phones off. No notes, human assistance, or cheat-sheets. You may **not** use a calculator.*

Each problem is worth 3 points; although there are 6 problems there is a maximum of 15 points.

1. Calculate derivatives of the following functions.

(a) $f(x) = \sin(5x)$

(b) $g(x) = e^{7x^8-1}$

(c) $h(x) = \sin^{-1}(x)$

(d) $j(x) = -4$

2. The function shown in Figure 2 is $f(x)$. On the same axes, sketch $f'(x)$.

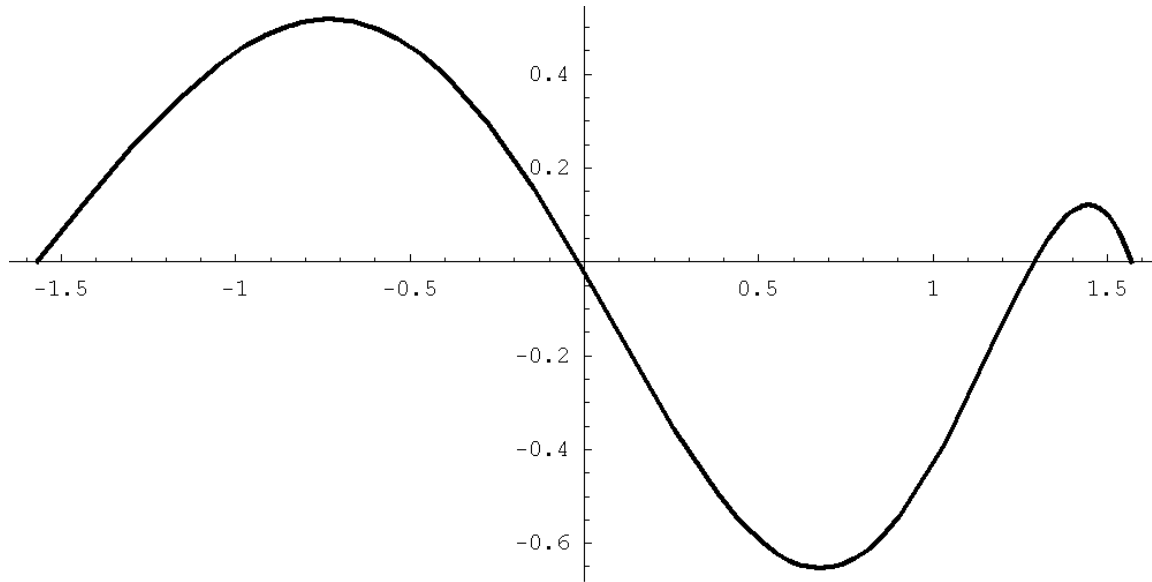


Figure 1:

3. Give a formula for the tangent line to $f(x) = \cos(x) + 3e^x + \sqrt{x}$ at the point $x = 3$.

4. Label the roots, local maxima and minima, and inflection points of the graph shown in Figure 1. Make sure you label them in such a way that I can tell which is which!

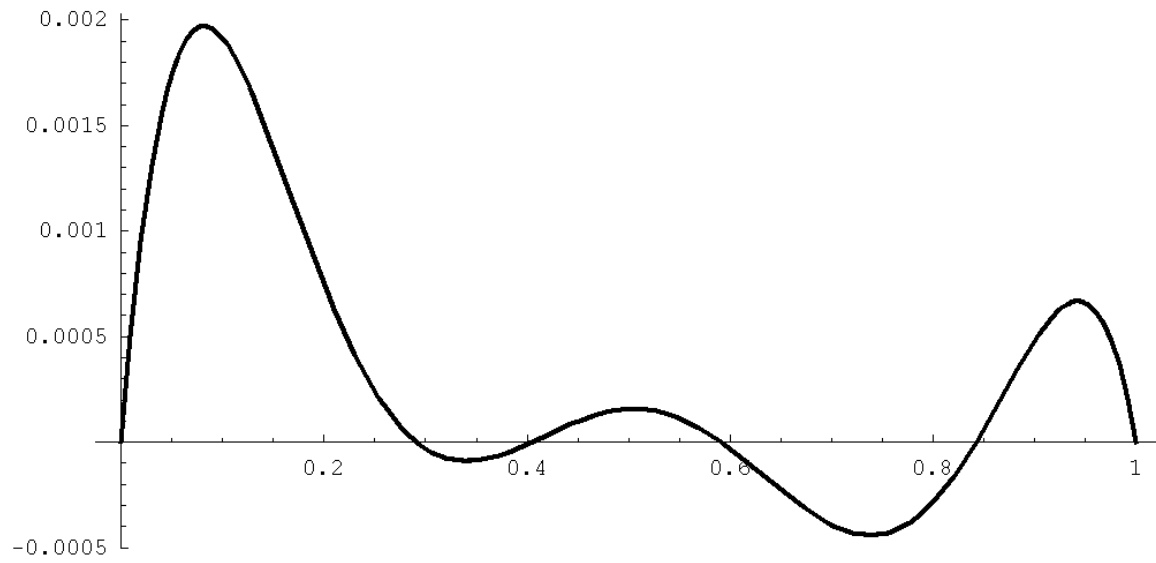


Figure 2:

5. Assume that oil spilled from a ruptured tanker spreads in a circular pattern whose area increases at a constant rate of 140 square meters per second. How fast is the radius of the spill increasing when the radius of the spill is 10 meters?

6. Find the location of all local minima of $f(x) = -2x^3 + 12x^2 - 18x + 1$ on the interval $-6 \leq x \leq 6$. Which one is the global minimum on this interval?

Sample2

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Each problem is worth 3 points; although there are 6 problems there is a maximum of 15 points.

1. Give a formula for the tangent line to $f(x) = 2 \cos(x) + 3e^x + 3\sqrt{x}$ at the point $x = 4$.

2. Calculate derivatives of the following functions.

(a) $f(x) = 3x - 3$

(b) $g(x) = e^{8 + \frac{10}{x^3}}$

(c) $h(x) = \csc(x)$

(d) $j(x) = \cos(5x)$

3. Assume that oil spilled from a ruptured tanker spreads in a circular pattern whose area increases at a constant rate of 150 square feet per second. How fast is the radius of the spill increasing when the radius of the spill is 10 feet?

4. Find the location of all local maxima of $f(x) = 2x^3 - 12x^2 + 18x$ on the interval $-7 \leq x \leq 4$. Which one is the global maximum on this interval?

5. Label the roots, local maxima and minima, and inflection points of the graph shown in Figure 1. Make sure you label them in such a way that I can tell which is which!

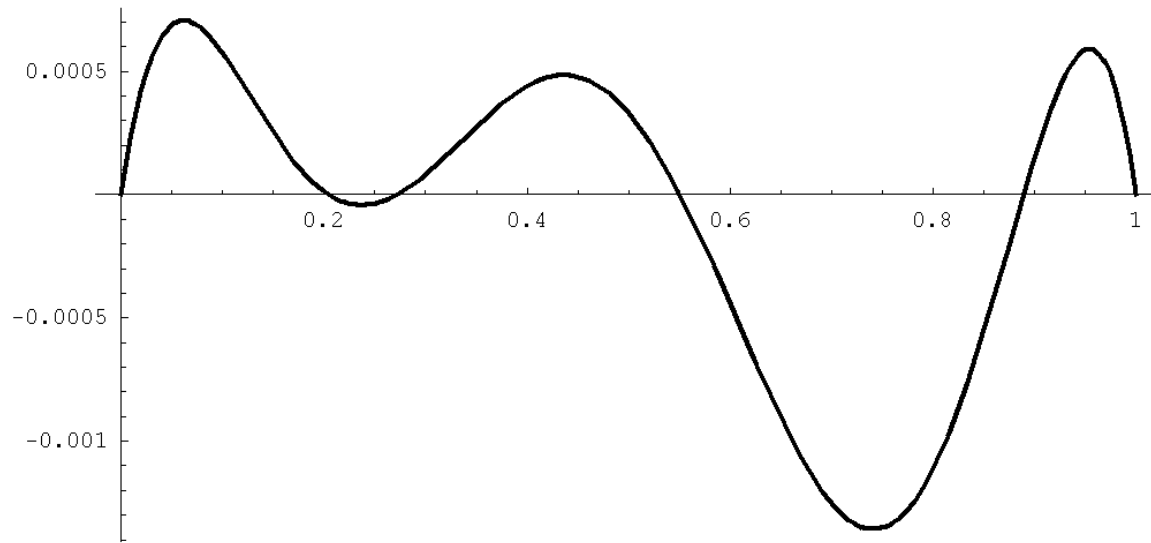


Figure 1:

6. The function shown in Figure 2 is $f(x)$. On the same axes, sketch $f'(x)$.

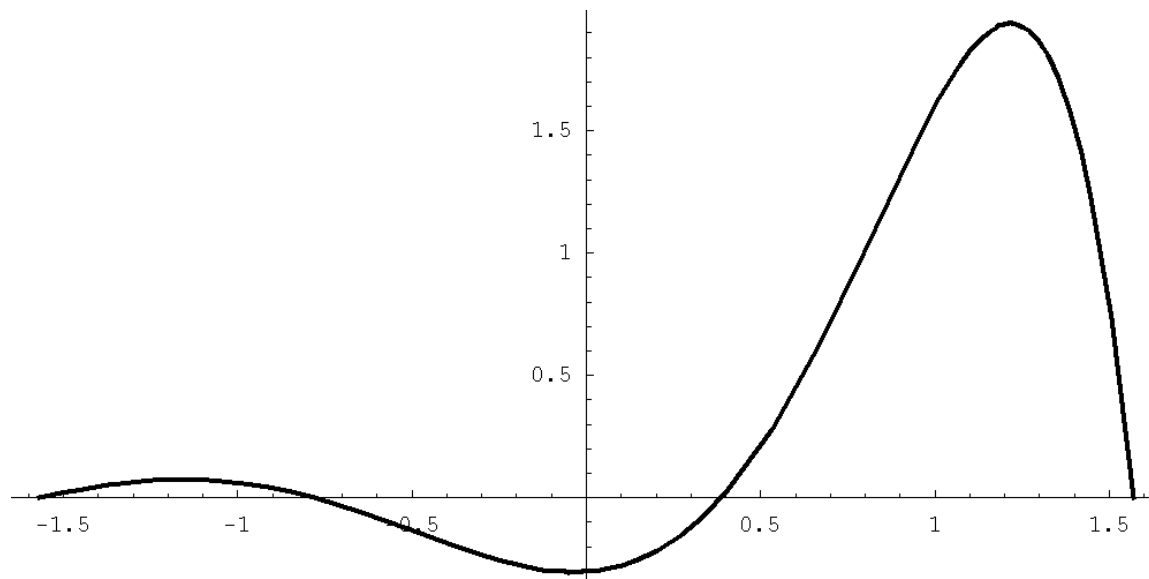


Figure 2: