
Answer the following questions. Display your answers clearly and neatly. Explain your reasoning. Use complete sentences.

1. Carry out the following steps to sketch the graph of
   \[ f(x) = x\sqrt{4-x^2}. \]
   (a) Give the domain of \( f \) and \( f' \).
   (b) Find the locations of the local extrema for \( f \). Compute the local maximum and minimum values. Give the intervals of increase and decrease.
   (c) Find the inflection points for \( f \). Give the intervals where \( f \) is concave up and concave down.
   (d) Determine if \( f \) is even or odd.
   (e) Sketch a graph which reflects the above information.

2. Let \( A \) be a real number and consider the cubic polynomial,
   \[ p(x) = x^3 + Ax^2 + 3x. \]
   (a) Find \( p'(x) \) and find an expression which gives the critical numbers for \( p \) in terms of \( A \).
   (b) Find all values of \( A \) for which \( p \) has exactly one critical number.
   (c) Find all values of \( A \) for which \( p \) has two critical numbers.
   (d) Find all values of \( A \) for which \( p \) has no critical numbers.
   (e) Give a sketch of the graph of the polynomial when \( A = 3 \) and verify that your sketch agrees with your answers to (b-d). A simple sketch obtained by plotting a few points will be sufficient. You do not need to determine intervals of increase, decrease and concavity.

Hint: For this problem, it may be helpful to recall the discriminant of a quadratic equation. See worksheet 2.
Answer the following questions. Display your answers clearly and neatly. Explain your reasoning. Use complete sentences.

1. Suppose that a circle of radius $r$ is inscribed inside a hexagon. Find the area of the hexagon. Hint: You may divide the hexagon into six equilateral triangles with altitude $r$.

2. Answer parts 1-4 of the project in Stewart, pages 288–89.

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**Tutoring and review sessions**

- Monday, 6 March 2006 6–8pm Review session CB102
- Monday, 13 March 2006 6–9pm Spring break No tutoring
- Monday, 20 March 2006 6–9pm Tutoring Young Library B25
- Monday, 27 March 2006 6–9pm Tutoring Young Library B25
- Monday, 3 April 2006 6–8pm Review session CB102
- Monday, 10 April 2006 6–9pm Tutoring Young Library B25
- Monday, 17 April 2006 6–9pm Tutoring Young Library B25
- Monday, 24 April 2006 6–9pm Tutoring Young Library B25
- Sunday, 30 April 2006 6–8pm Review session CB102

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