

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

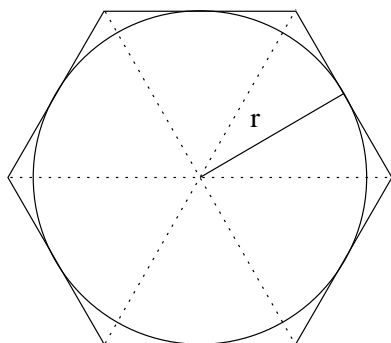
$$f(x) = x\sqrt{4 - x^2}.$$

- (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

March 7, 2006