

DUE Tuesday, October 17, 2006

Directions:

- You may work in groups, however every student must turn in their own solutions and justification must be provided for full credit.
 - Answer neatly on loose-leaf paper.
 - Full credit will be given for correct answers on any 4 out of the following 6 problems.
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- 1) Consider the following quadratic polynomial which is given in general form, $y = -2x^2 + 12x - 10$.

Sketch the graph of this quadratic by:

- 1) Finding its vertex.
- 2) Finding all intercepts.
- 3) Plotting additional points if necessary.

- 2) Write the equation of THE quadratic polynomial that has x-intercepts at the points $(-1,0)$ and $(5,0)$ and has a maximum value of 5.

Hint: To write the equation in standard form, you need to figure out the value of the three constants, a, h, and k.

- 3) True or False? Justify your answer with a short explanation or give an example equation which satisfies or contradicts the statement..
- a. A fourth degree polynomial equation can have only one x-intercept.
 - b. A fourth degree polynomial that contains the point $(0,-2)$ can have only one x-intercept.
 - c. A fourth degree polynomial that contains the point $(0,-2)$ and has a positive leading coefficient can have only one x-intercept.

- 4) Divide the following using any appropriate method:

a. $(2x^4 + 12x - 10) \div (x^2 + 1)$

b. $(2x^4 + 12x - 10) \div (x + 1)$

- 5) Use synthetic division to determine whether or not $(x + i)$ is a factor of $(x^2 + 1)$.

Recall that i is the imaginary unit. Refer to pages 144/145 for help with complex number arithmetic.

Hint: You can still use synthetic division when the divisor is a complex number.

- 6) Use the quadratic formula to find the zeros of $f(x) = \frac{1}{2}x^2 - 4x + 12$. Explain what you know about the graph of this function now that you have the zeros.