Math 134 Spring 2018
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Classwork 24 Name: _____

Work on as many problems as you can together with your group members. Towards the end of lecture your group will be asked to present problems correctly to receive classwork points.

1. Use the Rational Root Test to list all possible rational roots for the given function.
   (a) $f(x) = 3x^4 - 19x^3 + 20x^2 + 5x - 6$
   (b) $f(x) = 4x^4 - x^3 + 2x^2 - 5x - 26$
   (c) $f(x) = 9x^4 - x^3 + 2x^2 - 5x - 39$
   (d) $f(x) = 4x^4 - x^3 + 5x^2 - 2x - 10$
   (e) $f(x) = 9x^4 - x^3 + 2x^2 - 2x - 15$
2. The function $f(x)$ is given. List all possible rational roots. Then use synthetic division to test several possible rational roots in order to identify one actual root.
   (a) $f(x) = x^4 - 6x^3 - 3x^2 + 24x - 4$
   (b) $f(x) = x^4 + 2x^3 - 10x^2 - 18x + 9$
   (c) $f(x) = x^3 - 6x - 4$
   (d) $f(x) = x^3 - 37x + 6$
   (e) $f(x) = x^3 - 5x^2 - 9x + 45$
3. Find an nth-degree polynomial function $f(x)$ with real coefficients satisfying the given conditions.
   (a) $n = 3$; 4 and $4i$ are roots of f; $f(2) = -40$
   (b) $n = 3$; 2 and $2i$ are roots of f; $f(1) = 10$
   (c) $n = 4$; i and $2i$ are roots of f; $f(-1) = 130$
   (d) $n = 4$; i and $2i$ are roots of f; $f(-1) = 10$
   (e) $n = 4$; $2i$ and $3i$ are roots of f; $f(-2) = 104$
4. Use Descartes' Rule of Signs to determine the possible numbers of positive and negative real roots of $f(x)$
   (a) $f(x) = x^3 + 2x^2 + 3x + 7$
   (b) $f(x) = -6x^3 + 2x^2 - 3x + 5$
   (c) $f(x) = x^3 + 2x^2 + 5x + 8$
   (d) $f(x) = 5x^4 - 9x^3 - 6x^2 - 7x + 8$
   (e) $f(x) = x^3 - 3x^2 - 33x + 35$

5. Find all the roots of the polynomial function. Use the Rational Root Test and Descartes's Rule of Signs to obtain the first root.

   (a) $f(x) = x^3 - 6x^2 - 9x + 14$

   (b) $f(x) = x^3 + 2x^2 - 5x - 6$

   (c) $f(x) = x^3 - 13x^2 + 47x - 35$

   (d) $f(x) = x^4 - 2x^3 + x^2 + 12x + 8$

   (e) $f(x) = 2x^3 - 17x^2 - 11x - 1$