MAC 1140

LA session

Week 3

1. Factor completely
   a) $3x^3 - 18x^2 - 48x$
   b) $x^3 - 2x^2 - x + 2$
   c) $x^6 - 2x^3 + 1$
   d) $2(x+1)^4(2x-3)^3 - 4(x+1)^3(2x-3)^4$
   e) $8x^3 - 27$

2. Use synthetic division to find the quotient and remainder when $-2x^3 + 3x^2 - 1$ is divided by $x + 2$

3. Use synthetic division to determine whether $(x - 2)$ is a factor of $x^3 - 5x^2 + 7x - 2$

4. Use the Remainder Theorem to find the remainder when $f(x) = 2x^5 - 3x^4 + 5x^2 - 3x + 4$ is divided by $x + 1$.

5. How are the zeros of a function defined? What is the maximum number of real zeros that a polynomial function can have? How many real zeros can the function $f(x) = 3x^6 - 3x^4 - 4x^3 + 7x - 2$ have?

6. List all potential rational zeros of each polynomial function. Do not attempt to find the zeros.
   a) $f(x) = -2x^5 + x^4 - 3x^2 + 7x + 15$
   b) $f(x) = 3x^4 + 2x^3 - 8$

7. Find all real zeros of each polynomial function and use them to factor each function over the real numbers.
   a) $f(x) = 2x^4 + 3x^3 - 8x^2 - 9x + 6$
   b) $f(x) = x^5 - 2x^4 - 2x^3 - 2x^2 - 3x$

8. Find real solutions of the following equations
   a) $x^3 - 2x + 1 = 0$
   b) $4x^4 - 12x^3 + 11x^2 - 3x = 0$