Math 1015 - Polynomials Homework

Note Title 10/7/2009

① Make sure you can state the following theorems:

a) on the number of zeroes of a polynomial

b) on the number of extrema of a polynomial

c) the Factor theorem

d) the Intermediate Value Theorem

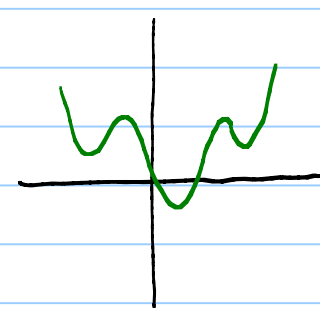
e) the Rational Roots Theorem

f) the Descartes's Rules of Signs theorem

② What is the minimum degree of polynomials with the following graphs

a)

b)



③ Is there a remainder dividing the following polynomials:

a) $-6x^3 + 13x^2 - 9x + 2$ by $x-1$ Yes / No

b) $x^4 - x^3 - x^2 - x - 1$ by $x-2$ Yes / No

(4) Divide $p(x) = x^3 - x^2 + 2x - 2$ by $x-1$

Divide $q(x) = 2x^3 - x^2 + 5x - 1$ by $x-2$

(5) Factor completly $p(x) = x^3 - 2x^2 - x + 2$

(6) Show that $p(x) = x^4 - 2x^2 - 1$ has at least one zero between $x=0$ and $x=2$.

(7) If $p(x) = 2x^5 - 3x^2 + 6$ had rational zeros, list all possible ones. Do all the numbers you listed actually <u>have</u> to be zeros? Could there be any other zeros? How many zeros does $p(x)$ have, by the way?

(8) How many zeros does $p(x) = 3x^5 + 4x^2 - x - 2$ have? How about $q(x) = x^3 - 2x^2 - x + 2$? And what can you say about the number of zeros of $r(x) = 6x^6 + 4x^4 + 2x^2 + 2$

(9) Find all vertical asymptotes of

a) $r(x) = \dfrac{x}{x^2 - 2x - 3}$

b) $s(x) = \dfrac{x+3}{x^2 - x - 12}$

(10) What is the domain of

a) $r(x) = \dfrac{x+3}{x^2-4}$

b) $s(x) = \dfrac{3-x}{2x^2+x-4}$