

NAME: _____

DO NOT write your answers here. Do it in other sheets and **show all your work**.

STAPLE this sheet to your other sheets.

1. Use synthetic division and the remainder theorem to find the indicated function value.

a) $f(x) = x^3 - 4x^2 + x + 2$; find $f(3)$.

b) $f(x) = -2x^4 - x^2 + x - 2$; find $f(-1)$.

c) $f(x) = x^5 - 4x^2 + 1$; find $f(2)$.

d) $f(x) = -x^4 - 5x^3 - x^2 + 3x + 2$; find $f\left(\frac{1}{2}\right)$.

2. Solve the following polynomial equations. (We did several examples in class.)

a) $x^3 - 4x^2 - 7x + 10 = 0$

b) $3x^3 - 8x^2 - 8x + 8 = 0$

c) $x^4 + 3x^3 - 20x^2 + 24x - 8 = 0$

d) $x^4 - x^3 + 2x^2 - 4x - 8 = 0$

3. Use the results of the previous exercise to factor the following polynomials completely.

[NOTE: you DO NOT need to do any calculation, only use the *factor theorem*.]

a) $x^3 - 4x^2 - 7x + 10$

b) $3x^3 - 8x^2 - 8x + 8$

c) $x^4 + 3x^3 - 20x^2 + 24x - 8$

d) $x^4 - x^3 + 2x^2 - 4x - 8$

4. Solve the equation $(x - 1)^2(x - 2)(x - 3)(x + 4) = 0$.

[NOTE: you DO NOT need to do any calculation for this one; use the *factor theorem* to find the solution by just looking at the equation.]

5. Find the possible rational zeros of the following polynomials.

a) $4x^3 + 5x^2 - 3x + 6$

b) $6x^4 + 3x^2 + 4x - 15$