

Written assignments  
to hand in.

Section 3.3

12, 58

due Tuesday 11/14

Section 3.5

24, 32

due Friday 11/17

Section 3.6

52, 54

due Monday 11/20

Section 3.5

(23)

$$P(x) = x^3 + 4x = x(x^2 + 4) \leftarrow \begin{array}{l} \text{complete factorization} \\ \text{over the real numbers} \end{array}$$

"zeros" of  $p(x)$   
given by

$$x=0 \text{ and } x^2 + 4 = 0$$

$$x^2 = -4$$

$$x = \pm\sqrt{-4}$$

$$x = \pm\sqrt{4(-1)}$$

$$x = \pm\sqrt{4}\sqrt{-1} = \pm 2i$$

"zeros" are  
 $x=0, 2i, -2i$

Discussion Problems  
From the department syllabus  
These are not to hand in.

3.5 19-35 odd, 47-63 odd

WebAssign

Section 3.6

Due Monday 11/20 9pm

$P(x) = x(x-2i)(x+2i)$  complete factorization  
over the complex numbers.

(26)  $Q(x) = x^4 - 625$        $625 = 25^2 = 5^4$

$$= (x^2 - 25)(x^2 + 25)$$

$$= (x-5)(x+5)(x^2+25) \leftarrow \text{complete factorization over the real numbers}$$

$$= (x-5)(x+5)(x-5i)(x+5i) \leftarrow \text{complete factorization over the complex numbers.}$$

Zeros of  $Q(x)$  are

$$x = 5, -5, 5i, -5i$$

(57) Find all the zeros of

$$P(x) = x^5 - x^4 + 7x^3 - 7x^2 + 12x - 12$$

$$= (x^5 - x^4) + (7x^3 - 7x^2) + (12x - 12)$$

$$= x^4(x-1) + 7x^2(x-1) + 12(x-1)$$

$$= (x^4 + 7x^2 + 12)(x-1)$$

$$a^2 + 7a + 12 = (a+3)(a+4)$$

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

Zeros are given by

$$x^2+3=0, \quad x^2+4=0, \quad x-1=0$$

$$x^2 = -3$$

$$x = \pm\sqrt{3}i$$

$$x^2 = -4$$

$$x = \pm 2i$$

$$x = 1$$