Notes Section 4.4

Factoring a Polynomial Completely
Factor a Polynomial with Quadratic Formula
Use the Conjugate Zeros Theorem
With Irrational Zeros
With Complex Zeros
Find a Polynomial with Specified Zeros

1-12 A polynomial P is given.
(a) Find all zeros of P, real and complex.
(b) Factor completely.

8. $P(x) = x^4 + 6x^2 + 9$

10. $P(x) = x^3 - 8$

5. $P(x) = x^4 + 2x^2 + 1$

13-30 Factor the polynomial completely and find all its zeros.
State the multiplicity of each zero.

20. $P(x) = x^4 - 625$

28. $P(x) = x^5 + 7x^3$

23. $P(x) = x^3 + x^2 + 9x + 9$

31-40 Find a polynomial with integer coefficients that satisfies the given conditions.

34. Q has degree 3, and zeros 0 and i.

36. Q has degree 3, and zeros -3 and $1 + i$.

31. Q has degree 2, and zeros $1+i$ *and* $1-i$.

41-56 Find all zeros of the polynomial.

44. $P(x) = x^3 + 7x^2 + 18x + 18$

53. $P(x) = x^4 - 6x^3 + 13x^2 - 24x + 36$

55. $P(x) = x^5 - 3x^4 + 12x^3 - 28x^2 + 27x - 9$

57-62 A polynomial P is given.
(a) Factor P into linear and irreducible quadratic factors with real coefficients.
(b) Factor P completely into linear factors with complex coefficients.

60. $P(x) = x^4 + 8x^2 + 16$

61. $P(x) = x^6 - 64$ (use $a^3 - b^3 = (a-b)(a^2 + ab + b^2)$