Worksheet A: (Topic 1.5) Polynomials and Complex Zeros   Name:

Directions: For each of the following polynomials, state the degree of the polynomial, determine all real zeros of the polynomial and the multiplicity of each zero.

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

Degree of polynomial: _____

Zeros (with multiplicity): _____

2. $g(x) = -2x(x - 5)^3(x + 1)^2$

Degree of polynomial: _____

Zeros (with multiplicity): _____

3. $h(x) = x^3(x + 4)(x - e)$

Degree of polynomial: _____

Zeros (with multiplicity): _____

4. $k(x) = -3(x + 7)^4(2x + 1)^2$

Degree of polynomial: _____

Zeros (with multiplicity): _____

5. $y = (x^2 - 9)(x^2 - 4x + 4)$

Degree of polynomial: _____

Zeros (with multiplicity): _____

6. $p(x) = x^3 + 10x^2 + 25x$

Degree of polynomial: _____

Zeros (with multiplicity): _____

7. $m(x) = (x^2 - 1)(x^2 + 2x + 1)$

Degree of polynomial: _____

Zeros (with multiplicity): _____

8. $4x^3(x^2 - 2x - 8)(x^2 + x - 20)$

Degree of polynomial: _____

Zeros (with multiplicity): _____

Directions: Given the following complex zeros of a polynomial function, determine the conjugate that must also be a zero for the given polynomial.

9. $x = 3 - 2i$

10. $x = -4 + 6i$

11. $x = 5 + i$

12. $x = -1 - i$

13. $x = 4i$

14. $x = -3i$

Directions: A polynomial has the following zeros. Determine the least possible degree of the polynomial.

15. $x = 3$ (multiplicity 2), $x = 3i$, and $x = 4 - i$

16. $x = 0$, $x = -1$ (multiplicity 3), $x = 5$ (multiplicity 2), and $x = -1 + 5i$

Directions: Factor the following expressions, if possible. If the expression cannot be factored, write "Not Factorable".

17. $x^2 - 25$

18. $x^3 + 5x^2 + 6x$

19. $(x^2 - 49)(x^2 + 5x - 14)$

20. $(x^2 + 4)(x^2 + 9)$

21. $2x^2 - x - 6$

22. $(2x^2 - 7x - 4)(x^2 - x - 12)$