

$$1. f(x) = (x+1)(x+\sqrt{10})(x-\sqrt{10})$$

$$f(x) = (x+1)(x^2 - \sqrt{10}x + \sqrt{10}x - 10)$$

$$f(x) = (x+1)(x^2 - 10)$$

$$f(x) = x^3 - 10x + x^2 - 10$$

$$f(x) = x^3 + x^2 - 10x - 10$$

Radicals & imaginary come in conjugate pairs

$$2. f(x) = x^3 - 5x^2 + 2x + 8$$

$$3. f(x) = x^3 - 7x^2 + 14x - 8$$

$$4. f(x) = (x-i)(x+i)(x+3i)(x-3i)$$

Conjugate pairs

$$f(x) = (x^2 - \cancel{xi} + \cancel{xi} - i^2)(x^2 - 3xi + 3xi - 9i^2)$$

$$f(x) = (x^2 + 1)(x^2 + 9)$$

$$f(x) = x^4 + 9x^2 + 1x^2 + 9$$

$$f(x) = x^4 + 10x^2 + 9$$

$$5. f(x) = x(x-2)(x+3)$$

$$f(x) = x(x^2 + 3x - 2x - 6)$$

$$f(x) = x(x^2 + x - 6)$$

$$f(x) = x^3 + x^2 - 6x$$

$$6. f(x) = x^4 + 9x^3 + 26x^2 + 24x$$

$$7. f(x) = x^3 - 4x^2 - 10x + 40$$

$$8. f(x) = x^3 + 2x^2 - 16x - 32$$

$$9. f(x) = x^3 + 7x^2 + 10x$$

$$10. f(x) = x^3 + 11x^2 + 21x$$

$$11. f(x) = x^3 + 27 \\ (x)^3 + (3)^3 = (x+3)(x^2 - 3x + 9)$$

$$12. (x-4)(x^2 + 4x + 16)$$

$$13. (x+2)(x^2 - 2x + 4)$$

$$14. (x-1)(x^2 + x + 1)$$

$$15. (x-5)(x^2 + 5x + 25)$$

$$16. f(x) = x^3 + 6x^2 + 5x \\ f(x) = x(x^2 + 6x + 5)$$

$$f(x) = x(x+1)(x+5)$$

$$17. f(x) = x^4 - 14x^2 + 45 = 0$$

$$f(x) = (x^2 - 5)(x^2 - 9)$$

$$f(x) = (x^2 - 5)(x-3)(x+3)$$

$$18. (x^2 + 3)(x^2 + 2)$$

$$19. (x^2 + 5)(x^2 + 7)$$

$$20. f(x) = x^4 + 8x \\ = x(x^3 + 8) \\ = x[(x)^3 + (2)^3] \\ = x(x+2)(x^2 - 2x + 4)$$

$$23. f(x) = x^4 - 3x^2 + 2$$

ZEROS

1. $x=1$
2. $x=-1$
3. $x=\sqrt{2}$
4. $x=-\sqrt{2}$

$$(x^2-1)(x^2-2)$$

$$(x+1)(x-1)(x^2-2)$$

$$x=-1 \quad x=1 \quad x^2-2=0$$

$$\sqrt{x^2-2}$$

$$x=\pm\sqrt{2}$$

$$24. f(x) = x^3 + 64$$

ZEROS

1. $x=-4$
2. $x=2+2i\sqrt{3}$
3. $x=2-2i\sqrt{3}$

$$(x)^3 + (4)^3$$

$$(x+4)(x^2-4x+16)$$

$$4 \pm \sqrt{(4)^2 - 4(1)(16)}$$

$$\frac{2(1)}{2}$$

$$4 \pm \sqrt{-48}$$

$$\frac{2}{2}$$

$$4 \pm 4i\sqrt{3}$$

$$\frac{2}{2}$$

$$2 \pm 2i\sqrt{3}$$

$$25. \text{ZEROS: } 1) x=4 \quad 2) x=\sqrt{3} \quad 3) x=-\sqrt{3}$$

$$26. \text{ZEROS: } 1) x=\sqrt{2} \quad 2) x=-\sqrt{2} \quad 3) x=2\sqrt{2} \quad 4) x=-2\sqrt{2}$$

$$27. f(x) = x^3 - x^2 + 4x - 4$$

ZEROS

1. $x=1$
2. $x=2i$
3. $x=-2i$

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

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

$$(x+2i)(x-2i)(x-1)$$

$$28. \text{ZEROS: } 1) x=2 \quad 2) x=-1+i\sqrt{3} \quad 3) x=-1-i\sqrt{3}$$