

## Factoring Rules:

1. Difference of Squares:

$$a^2 - b^2 = \frac{(a-b)(a+b)}{1}$$

2. Sum of Cubes:

$$a^3 + b^3 = \frac{(a+b)(a^2 - ab + b^2)}{1}$$

3. Difference of Cubes:

$$a^3 - b^3 = \frac{(a-b)(a^2 + ab + b^2)}{1}$$

4.  $x^4 - 36$

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

5.  $64c^3 + 1$

$$(4c+1)(16c^2 - 4c + 1)$$

6.  $k^3 - 27$

$$(k-3)(k^2 + 3k + 9)$$

7.  $54x^3 + 250y^3$

$$2 \times 2(27x^3 + 125y^3)$$

$$2(3x + 5y)(9x^2 - 15xy + 25y^2)$$

8.  $3m^4 - 48n^2$

$$3(m^4 - 16n^2)$$

$$3(m^2 - 4n)(m^2 + 4n)$$

9.  $a^7b^2 - ab^2$

$$ab^2(a^6 - 1)$$

$$ab^2(a^3 - 1)(a^3 + 1)$$

$$ab^2(a - 1)(a^2 + a + 1)(a + 1)(a^2 - a + 1)$$

10.  $x^3y^2 - 343y^5$

$$y^2(x^3 - 343y^3)$$

$$y^2(x - 7y)(x^2 + 7xy + 49y^2)$$

11.  $9y^7 - 144y$

$$y(9y^6 - 144)$$

$$y(9y^3 - 12) \cdot 39y(y^3 - 4)$$

$$9y(y^3 - 4)(y^3 + 4)$$

12.  $x^4 - 12x^2 + 36$

$$(x^2 - 6)^2$$

13.  $w^4 - 14w^2 - 32$

$$(w-16)(w+2)$$

$$14. 9y^6 + 6y^4 + y^2$$

$$y^2(9y^4 + 6y^2 + 1)$$
$$y^2(3y^2 + 1)^2$$

$$15. k^3 + 7k^2 - 44k$$

$$k(k+11)(k-4)$$

$$16. 2a^3 + 28a^2 + 96a$$

$$2a(a^2 + 14a + 48)$$

$$2a(a+6)(a+8)$$

$$17. -x^3 + 4x^2 + 21x$$

$$~~-x(x^2 + 4x + 21)~~$$

$$-x(x^2 - 4x - 21)$$

$$-x(x-7)(x+3)$$

$$18. m^6 - 7m^4 - 18m^2$$

$$m^2(m^4 - 7m^2 - 18)$$

$$m^2(m^2 - 9)(m^2 + 2)$$

$$19. 8c^4 + 10c^2 - 3$$

$$(2c^2 + 3)(4c^2 - 1)$$

$$(2c^2 + 3)(2c - 1)(2c + 1)$$

$$20. x^3 - 7x^2 + x - 7$$

$$x^2(x-7) + 1(x-7)$$

$$(x-7)(x^2+1)$$

$$21. 4r^3 - 3r^2 - 4r + 3$$

$$r^2(4r-3) - 1(4r-3)$$

$$(4r-3)(r^2-1)$$

$$(r-1)(r+1)(4r-3)$$

$$22. 3p^3 + 5p^2 - 12p - 20$$

$$p^2(3p+5) - 4(3p+5)$$

$$(p^2-4)(3p+5)$$

$$(p-2)(p+2)(3p+5)$$

$$23. 15n^3 - 6n^2 - 25n + 10$$

$$3n^2(5n-2) - 5(5n-2)$$

$$(5n-2)(3n^2-5)$$