

Factoring

① $5x^2 - 7x - 6$
 $5x^2 - 10x + 3x - 6$
 $5x(x-2) + 3(x-2)$
 $(5x+3)(x-2)$

② $5x^2 - 31x + 6$
 $5x^2 - 30x - x + 6$
 $5x(x-6) - (x-6)$
 $(5x-1)(x-6)$

③ $25 - 81y^2$
 $a: 5 \quad b: 9y \quad (a^2 - b^2)$
 $(5+9y)(5-9y)$

④ $9x^2 - 81$
 $9(x^2 - 9)$
 $9(x+3)(x-3)$

⑤ $2x^3 + x^2 - 6x - 3$
 $x^2(2x+1) - 3(2x+1)$
 $(x^2-3)(2x+1)$

⑥ $3x^3 + 9x^2 + x + 3$
 $3x^2(x+3) + (x+3)$
 $(3x^2+1)(x+3)$

⑦ $3x(x-2) + 5(x-2)$
 $(x-2)(3x+5)$

⑧ $y^2(y-3) - 5(y-3)$
 $(y^2-5)(y-3)$

⑨ $125x^3 + 1$
 $a^3 + b^3 \quad a: 5x \quad b: 1$

$(5x+1)(25x^2 - 5x + 1)$

⑩ $64 - 27a^3$
 $a^3 - b^3 \quad a: 4 \quad b: 3a$

$(4-3a)(16+12a+9a^2)$

⑪ $6x + x^2 + 8$
 $x^2 + 6x + 8$

$(x+4)(x+2)$

⑫ $x^2 - x - 12$

$(x-4)(x+3)$

⑬ $x^2 + 9$

can't factor

⑭ $x^2 - 5x + 36$

can't factor

⑮ $4x^2 + 20x + 25$

$4x^2 + 10x + 10x + 25$
 $2x(2x+5) + 5(2x+5)$
 $(2x+5)(2x+5)$

$(2x+5)^2$

⑯ $45a^2 - 30a + 5$

$5(9a^2 - 6a + 1)$
 $5(9a^2 - 3a - 3a + 1)$
 $5[3a(3a-1) - 1(3a-1)]$

$5(3a-1)(3a-1)$
 $5(3a-1)^2$

⑰ $ax - 3a - bx + 3b$
 $a(x-3) - b(x-3)$

$(a-b)(x-3)$

⑱ $xy + 3y - 5x - 15$

$y(x+3) - 5(x+3)$

$(y-5)(x+3)$

⑲ $25y^3 - 25$

$25(y^3 - 1)$
 $a^3 - b^3 \quad a: y \quad b: 1$

$25(y-1)(y^2+y+1)$

⑳ $a^3b^3 + 8$
 $a^3 + b^3$

$(ab+2)(a^2b^2 - 2ab + 4)$
 $a: ab \quad b: 2$

$(ab+2)(a^2b^2 - 2ab + 4)$

㉑ $y^4 - 16x^4$

$a^2 - b^2 \quad a: y^2 \quad b: 4x^2$

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

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

㉒ $5x^2 - 20$

$5(x^2 - 4)$

$5(x+2)(x-2)$

㉓ $a^2b^7 + 3a^3b^5 - a^2b^4$

$a^2b^4(b^3 + 3ab^2 - 1)$

24) $3x^4 + 15x^3 - 3x^2$
 $3x^2(x^2 + 5x - 1)$

25) $x + 21x^2 - 2$
 $21x^2 + x - 2$
 $21x^2 + 7x - 6x - 2$
 $7x(3x+1) - 2(3x+1)$
 $(7x-2)(3x+1)$

26) $3 - 22y + 7y^2$
 $7y^2 - 22y + 3$
 $7y^2 - 21y - y + 3$
 $7y(y-3) - (y-3)$
 $(7y-1)(y-3)$

27) $16 - 8a + a^2$
 $a^2 - 8a + 16$
 $(a-4)(a-4)$
 $(a-4)^2$

28) $x^2 + 6xy + 9y^2$
 $x^2 + 3xy + 3xy + 9y^2$
 $x(x+3y) + 3y(x+3y)$
 $(x+3y)(x+3y)$
 $(x+3y)^2$

29) $50 - 18x^4$
 $2(25 - 9x^4)$
 $2(5-3x^2)(5+3x^2)$
a: 5, b: 3x^2

30) $3x^4 + 14x^2 + 8$
 $3x^4 + 12x^2 + 2x^2 + 8$
 $3x^2(x^2+4) + 2(x^2+4)$
 $(3x^2+2)(x^2+4)$

31) $2y + 10 - 3xy - 15x$
 $2(y+5) - 3x(y+5)$
 $(2-3x)(y+5)$

32) $2x^3 - 3x^2 - 18x + 27$
 $x^2(2x-3) - 9(2x-3)$
 $(x^2-9)(2x-3)$
 $(x+3)(x-3)(2x-3)$

33) $24x^4 - 24x^2 + 20x^3$
 $24x^4 + 20x^3 - 24x^2$
 $4x^2(6x^2 + 5x - 6)$
 $4x^2[6x^2 + 9x - 4x - 6]$
 $4x^2[3x(2x+3) - 2(2x+3)]$
 $4x^2(3x-2)(2x+3)$

34) $8a^2b - 27ab + 9b$
 $b(8a^2 - 27a + 9)$
 $b[8a^2 - 24a - 3a + 9]$
 $b[8a^2 - 27a + 9]$
 $b[9a(a-3) - 3(a-3)]$
 $b(8a-3)(a-3)$

35) $a^5b^4 - a^7b^8 + a^6b^3$
 $a^5b^3(b - a^2b^5 + a)$

36) $(a+b)(c+d) - 2(a+b)(c-d)$
 $(a+b)[(c+d) - 2(c-d)]$
 $(a+b)[c+d - 2c + 2d]$
 $(a+b)(-c+3d)$

37) $m^2 - 10m + 16$
 $(m-8)(m-2)$

38) $8 + 7y - y^2$
 $-y^2 + 7y + 8$
 $-(y^2 - 7y - 8)$
 $-(y-8)(y+1)$

39) $(a+b)^3 - 8$
a: a+b, b: 2
 $(a+b-2)(a^2 + 2ab + b^2 + 2a + 2b + 4)$

40) $(c+d)^2 - 16$
a: c+d, b: 4
 $(c+d+4)(c+d-4)$

41) $2\sin^2x - \sin x - 1$
 $2\sin^2x - 2\sin x + \sin x - 1$
 $2\sin x(\sin x - 1) + (\sin x - 1)$
 $(2\sin x + 1)(\sin x - 1)$

42) ~~$\cos^2x \sin^2x +$~~

$$(42) \cos^2 x \sin^2 x + 2 \cos^2 x \sin x - 2 \cos^2 x$$

$$\boxed{\cos^2 x (\sin^2 x + 2 \sin x - 2)}$$

~~$\cos^2 x \sin$~~

$$(43) \sec^4 x - \tan^4 x \quad a^2 - b^2 \quad a: \sec^2 x$$

$$b: \tan^2 x$$

$$(\sec^2 x - \tan^2 x)(\sec^2 x + \tan^2 x)$$

$$\boxed{(\sec x + \tan x)(\sec x - \tan x)(\sec^2 x + \tan^2 x)}$$

$$(44) 4 \sin x \cos^3 x - 4 \sin^3 x \cos x$$

$$4 \sin x \cos x (\cos^2 x - \sin^2 x)$$

$$\boxed{4 \sin x \cos x (\cos x + \sin x)(\cos x - \sin x)}$$

$$(45) 3a^2 + 7ab - 6b^2$$

$$3a^2 + 9ab - 2ab - 6b^2$$

$$3a(a+3b) - 2b(a+3b)$$

$$\boxed{(3a-2b)(a+3b)}$$

$$(50) (x^2 + 2xy + y^2) - z^2$$

$$(x^2 + xy + xy + y^2) - z^2$$

$$(x(x+y) + y(x+y)) - z^2$$

$$(x+y)(x+y) - z^2$$

$$(x+y)^2 - z^2 \text{ diff of squares}$$

$$\boxed{(x+y+z)(x+y-z)}$$

$$(46) a^6 - b^6$$

$$(a^3 - b^3)(a^3 + b^3)$$

$$\boxed{(a-b)(a^2 + ab + b^2)(a+b)(a^2 - ab + b^2)}$$

$$(47) x^4 + 5x^2 - 6$$

$$(x^2 + 6)(x^2 - 1)$$

$$\boxed{(x^2 + 6)(x+1)(x-1)}$$

$$(48) 3r^2 + rx - 10x^2$$

$$3r^2 + 6rx - 5rx - 10x^2$$

$$3r(r+2x) - 5(r+2x)$$

$$\boxed{(3r-5)(r+2x)}$$

$$(49) (a+b)^2 + 3(a+b) + 2$$

$a+b$ is your "x".

$$\boxed{(a+b+2)(a+b+1)}$$