

$$\textcircled{1} \quad 5(3x+10)(x-4)$$

$$\textcircled{2} \quad (5n+6)(n+8)$$

$$\textcircled{3} \quad (5k-1)(k+1)$$

$$\textcircled{7} \quad (3x-8)(x-2)$$

$$\textcircled{9} \quad (3m+5)(m-9)$$

$$\textcircled{14} \quad (7k-2)(k-1)$$

$$\textcircled{15} \quad (5r-6)(r-1)$$

$$\textcircled{16} \quad (5k+4)(k-4)$$

$$\textcircled{17} \quad (3k+8)(k+1)$$

$$\textcircled{20} \quad (7p-6)(p-6)$$

$$\textcircled{21} \quad (x-1)(9x+4)$$

- 26 $(n-6)(4n-9)$
 27 $(2x+7)(3x-10)$
 28 $3(n+2)(4n+5)$

① $15x^2 - 10x - 200$

$5(3x^2 - 2x + 40)$

$-120x^2$
 $-12x \quad \underline{10x}$

$5(3x^2 - 12x + 10x - 40)$

$5(3x(x-4) + 10(x-4))$

$5(x-4)(3x+10)$

$$3. \cancel{5k^2 + 4k - 1} \\ -5k^2$$

GCF

$$5k^2 + 5k - 1k - 1 \\ 5k(k+1) - 1(k+1) \\ (5k-1)(k+1)$$

9) $3m^2 - 22m - 45$

no gcf

$3 \cdot -45 \rightarrow -135m^2$

$3 \cdot 45$

$3 \cdot 9 \cdot 5$

$3 \cdot 3 \cdot 3 \cdot 5$

$27 \cdot 5$

$\underline{-27m} \quad \underline{5m}$

$3m^2 - 27m + 5m - 45$

$$3m(m-9) + 5(m-9)$$
$$(m-9)(3m+5)$$

Factoring Special Cases

Difference of Squares

$$a^2 - b^2 = (a-b)(a+b)$$

$$a^2 - b^2 = (a-b)(a+b)$$

Two terms \rightarrow subtr. \rightarrow squares

1, 4, 9, 16, 25, 36, 49,

Ex. $r^2 - 4 = r^2 - 2^2$

$$(r-2)(r+2)$$

$$\textcircled{3} \quad \begin{array}{l} 9x^2 - 25 \\ (3x)^2 - 5^2 \end{array} = \boxed{(3x-5)(3x+5)}$$

sum of cubes

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

difference of cubes

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

CUBES:

$$1^3 = 1$$

$$2^3 = 8$$

$$3^3 = 27$$

$$4^3 = 64$$

$$5^3 = 125$$

$$6^3 = 216$$

$$7^3 = 343$$

Ex.

(14)

$125x^3 + 216$
sum of cubes

$$(5x)^3 + 6^3$$

$$a = 5x \\ b = 6$$

$$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$$

$$= (5x+6)((5x)^2 - 5x \cdot 6 + 6^2)$$

$$= (5x+6)(25x^2 - 30x + 36)$$

(#18) $16x^3 - 2$

$$2(8x^3 - 1)$$

Diff. of Cubes

$$(2x)^3 - 1^3$$

$$a = 2x \\ b = 1$$

$$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$$

$$\downarrow (2x-1) \left((2x)^2 + 2x \cdot 1 + 1^2 \right)$$

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

27

$$6x^2 + x - 70$$

$$-420x^2$$

$$21x \quad -20x$$

$$6x^2 + 21x - 20x - 70$$

$$3x(2x+7) - 10(2x+7)$$

$$(2x+7)(3x-10)$$

26

$$4n^2 - 33n + 54$$

$$2/6n^2$$

$$\dots - \frac{9n}{-24n}$$

$$4n^2 - 9n - 24n + 54$$

$$n(4n - 9) - 6(4n - 9)$$

$$(4n - 9)(n - 6)$$

28 $12n^2 + 39n + 30$

$$3(4n^2 + 13n + 10)$$

$$\downarrow (4n^2 + 5n + 8n + 10)$$
$$\downarrow (n(4n + 5) + 2(4n + 5))$$

$$\begin{array}{r} 40n^2 \\ 1 \quad 40 \\ 2 \quad 20 \quad 1 \\ 4 \quad 10 \\ \hline 5n \quad 8n \end{array}$$

$$3(n+2)(4n+5)$$

$$\textcircled{1} \quad 3n^2 - 12$$

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

$$3(n-2)(n+2)$$

(19)

$$27a^3 - 1$$

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

↑
a

↑
b

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$

$$= (3a - 1)(9a^2 + 3a \cdot 1 + 1^2)$$

$$= (3a - 1)(9a^2 + 3a + 1)$$

(14)

$$125x^3 + 216$$

no gcf

$$(5x)^3 + 6^3$$

↑
a

↑
b

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

$$(5x + 6)(5x)^2 - 5x \cdot 6 + 6^2$$

$$(5x + 6)(25x^2 - 30x + 36)$$