

Factor by Grouping

Factor each completely.

1) $14x^3 - 10x^2 - 7x + 5$

$2x^2(7x-5) - 1(7x-5)$

$(2x^2 - 1)(7x - 5)$

2) $p^3 - 7p^2 + 6p - 42$

$p^2(p-7) + 6(p-7)$

$(p^2 + 6)(p - 7)$

3) $4p^3 - 20p^2 - 5p + 25$

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

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

4) $8x^3 - 16x^2 - x + 2$

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

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

5) $3k^3 - 4k^2 - 9k + 12$

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

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

6) $32n^6 + 8n^5 - 48n^4 - 12n^3$

$4n^3(8n^3 + 2n^2 - 12n - 3)$

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

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

$$7) 4n^3 + 12n^2 - 20n - 60$$

$$4(n^3 + 3n^2 - 5n - 15)$$

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

$$\boxed{4(n^2 - 5)(n+3)}$$

$$9) 30x^3 - 18x^2 - 45x + 27$$

$$3(10x^3 - 6x^2 - 15x + 9)$$

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

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

$$11) 30xy - 12xb - 10by + 4b^2$$

$$2(15xy - 6xb - 5by + 2b^2)$$

$$3x(5y - 2b) - b(5y - 2b)$$

$$\boxed{2(3x - b)(5y - 2b)}$$

$$8) 15r^4 - 75r^3 + 12r^2 - 60r$$

$$3r(5r^3 - 25r^2 + 4r - 20)$$

$$5r^2(r-5) \quad 4(r-5)$$

$$\boxed{3r(5r^2 + 4)(r-5)}$$

$$10) 50a^2b^4 - 40a^2b^3 + 125ab^4 - 100ab^3$$

$$5ab^3(10ab^2 - 8ab + 25b^2 - 20)$$

$$2a(5b-4) \quad 5(5b-4)$$

$$\boxed{5ab^3(2a+5)(5b-4)}$$

$$12) 32x^2y + 24x^2n + 80mxy + 60n^2x$$

$$4x(8xy + 6xn + 20ny + 15n^2)$$

$$2x(4y+3n) \quad 5n(4y+3n)$$

$$\boxed{4x(2x+5n)(4y+3n)}$$