Factoring Polynomials

Emphasis on Factoring Polynomials by Grouping

Completely factor each of the following by Grouping:

1. $4v^3 - 12v^2 - 5v + 15$ $(4v^3 - 12v^2) - (5v - 15)$ $4v^2(v - 3) - 5(v - 3)$ $(4v^2 - 5)(v - 3)$	2. $49x^3 - 35x^2 + 56x - 40$ $(49x^3 - 35x^2) + (56x - 40)$ $7x^2(7x - 5) + 8(7x - 5)$ $(7x^2 + 8)(7x - 5)$
3. $24p^3 + 15p^2 - 56p - 35$ $(24p^3 + 15p^2) - (56p + 35)$ $3p^2(8p + 5) - 7(8p + 5)$ $(3p^2 - 7)(8p + 5)$	4. $24r^3 - 64r^2 - 21r + 56$ $(24r^3 - 64r^2) - (21r - 56)$ $8r^2(3r - 8) - 7(3r - 8)$ $(8r^2 - 7)(3r - 8)$
5. $8r^3 - 64r^2 + r - 8$ $(8r^3 - 64r^2) + (r - 8)$ $8r^2(r - 8) + 1(r - 8)$ $(8r^2 + 1)(r - 8)$	6. $12p^3 - 21p^2 + 28p - 49$ $(12p^3 - 21p^2) + (28p - 49)$ $3p^2(4p - 7) + 7(4p - 7)$ $(3p^2 + 7)(4p - 7)$
7. $12x^3 + 2x^2 - 30x - 5$ $(12x^3 + 2x^2) - (30x + 5)$ $2x^2(6x + 1) - 5(6x + 1)$ $(2x^2 - 5)(6x + 1)$	8. $6v^3 - 16v^2 + 21v - 56$ $(6v^3 - 16v^2) + (21v - 56)$ $2v^2(3v - 8) + 7(3v - 8)$ $(2v^2 + 7)(3v - 8)$
9. $63n^3 + 54n^2 - 105n - 90$ $(63n^3 + 54n^2) - (105n + 90)$ $9n^2(7n + 6) - 15(7n + 6)$ $(9n^2 - 15)(7n + 6)$ $3(3n - 5)(7n + 6)$	10. $21k^3 - 84k^2 + 15k - 60$ $(21k^3 - 84k^2) + (15k - 60)$ $21k^2(k - 4) + 15(k - 4)$ $(21k^2 + 15)(k - 4)$ $3(7k^2 + 5)(k - 4)$

11. $25v^3 + 5v^2 + 30v + 6$

$(25v^3 + 5v^2) + (30v + 6)$

$5v^2(5v + 1) + 6(5v + 1)$

$(5v^2 + 6)(5v + 1)$

12. $105n^3 + 175n^2 - 75n - 125$

$(105n^3 + 175n^2) - (75n + 125)$

$35n^2(3n + 5) - 25(3n + 5)$

$(35n^2 - 25)(3n + 5)$

$5(7n^2 - 5)(3n + 5)$

13. $96n^3 - 84n^2 + 112n - 98$

$(96n^3 - 84n^2) + (112n - 98)$

$12n^2(8n - 7) + 14(8n - 7)$

$(12n^2 + 14)(8n - 7)$

$2(6n^2 + 7)(8n - 7)$

14. $28v^3 + 16v^2 - 21v - 12$

$(28v^3 + 16v^2) - (21v + 12)$

$4v^2(7v + 4) - 3(7v + 4)$

$(4v^2 - 3)(7v + 4)$

15. $12a^3 - 9a^2 + 4a - 3$

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

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

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

16. $2p^3 + 5p^2 + 6p + 15$

$(2p^3 + 5p^2) + (6p + 15)$

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

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

17. $3n^3 - 4n^2 + 9n - 12$

$(3n^3 - 4n^2) + (9n - 12)$

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

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

18. $12n^3 + 4n^2 + 3n + 1$

$(12n^3 + 4n^2) + (3n + 1)$

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

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

19. $m^3 - m^2 + 2m - 2$

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

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

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

20. $5n^3 - 10n^2 + 3n - 6$

$(5n^3 - 10n^2) + (3n - 6)$

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

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