

Sum and Difference of Cubes (ALG.FAC.06)

Factor each expression completely.

1. $a^3 + 27$ $(a + 3)(a^2 - 3a + 9)$

2. $b^3 - 8$ $(b - 2)(b^2 + 2b + 4)$

3. $c^3 + d^9$ $(c + d^3)(c^2 - cd^3 + d^6)$

4. $125f^6 - 1$ $(5f^2 - 1)(25f^4 + 5f^2 + 1)$

5. $64g^6 - 343h^3$ $(4g^2 - 7h)(16g^4 + 28g^2h + 49h^2)$

6. $2j^6 - 2j^3$ $2j^3(j - 1)(j^2 + j + 1)$

7. $k^6 - k^4 + k^3 - k$ $k(k - 1)(k + 1)^2(k^2 - k + 1)$

8. $216m^3n^3 + 125n^3$ $n^3(6m + 5)(36m^2 - 30m + 25)$

9. $81n^4 - 54n^3 - 24n + 16$ $(3n - 2)^2(9n^2 + 6n + 4)$

10. $64p^5 - 112p^4 - 120p^3 - 8p^2 + 14p + 15$ $(4p + 3)(2p - 1)(2p - 5)(4p^2 + 2p + 1)$

11. $q^6 - 64$ $(q - 2)(q + 2)(a^2 + 2q + 4)(q^2 - 2q + 4)$

12. $x^8 - 25x^6 - 19x^5 + 475x^3 - 216x^2 + 5400$
 $(x - 5)(x + 5)(x + 2)(x^2 - 2x + 4)(x - 3)(x^2 + 3x + 9)$

13. $a^6x^3 + b^3y^6$ $(a^2x + by^2)(a^4x^2 - a^2bxy^2 + b^2y^4)$

14. $27m^{12}n^6 + 125m^3$ $m^3(3m^3n^2 + 5)(9m^6n^4 - 15m^3n^2 + 25)$

15. $r^5 + 18r^4 + 81r^3 + 729r^2 + 13122r + 59049$ $(r + 3)^3(r^2 - 9r + 81)$

16. $t^5 + 3t^4 - 18t^3 + 216t^2 + 648t - 3888$ $(t - 3)(t + 6)^2(t^2 - 6t + 36)$