1. What is the factorized form of $8a^3 + b^3 + 12a^2 b + 6ab^2$
   A. $(2a + b)^3$
   B. $(2a + b)(4a^2 + 2ab + b^2)$
   C. $(4a + b)(2a^2 + ab + b^2)$
   D. $(4a + b)(2a^2 - ab + b^2)$ (B)

Explanation: The given expression can be factorized as $(2a + b)(4a^2 + 2ab + b^2)$ using the formula for the sum of cubes and recognizing the terms as part of a perfect cube expansion

2. What is the factorized form of $8a^3$-b^3 $12a^2b$+ $6ab^2$?
   A. $(2a - b)(4a^2 + 2ab + b^2)$
   B. $(2a + b)(4a^2 - 2ab + b^2)$
   C. $(4a - b)(2a^2 + ab + b^2)$
   D. $(4a - b)(2a^2 - ab + b^2)$ (A)

Explanation: This is the factorized form of the expression, which is similar to the difference of cubes formula but with additional terms

3. What is the factorized form of $27 - 125a^3 - 135a + 225a^2$?
   A. $(3 - 5a)(9 + 15a + 25a^2)$
   B. $(3 + 5a)(9 - 15a + 25a^2)$
   C. $(3 + 5a)(9 + 15a – 25a^2)$
   D. $(3 - 5a)(9 - 15a – 25a^2)$ (A)

Explanation: The expression is factored as a difference of cubes, leading to the factorized form $(3 - 5a)(9 + 15a + 25a^2)$

4. What is the factorized form of $64a^3 - 27b^3 - 144a^2b + 108ab^2$?
   A. $(4a - 3b)(16a^2 + 12ab + 9b^2)$
   B. $(4a + 3b)(16a^2 - 12ab + 9b^2)$
   C. $(4a - 3b)(16a^2 - 12ab + 9b^2)$
   D. $(4a + 3b)(16a^2 + 12ab + 9b^2)$ (A)

Explanation: This expression is factored using the sum and difference of cubes identities to give $(4a-3b)(16a^2 + 12ab + 9b^2)$

5. What is the factorized form of $27p^3 - 9p^2 + 27p$?
   A. $9p(3p^2 - p + 3)$ B. $9p(3p^2 + p + 3)$
   C. $9p(3p^2 - 3p + 3)$ D. $9p(3p^2 + 3p + 3)$
   (A)

Explanation : Factoring out the greatest common factor 9p from the terms results in $9p(3p^2 - p + 3)$

6. What identity can be used to verify $x + y = (x + y)(x^2 - xy + y^2)$?
   A. Sum of cubes identity
   B. Difference of cubes identity
   C. Binomial expansion
   D. Quadratic expansion (A)

Explanation: The sum of cubes identity states that $x + y = (x + y)(x^2- xy + y^2)$, and this identity can be used for verification.

7. What is the factorized form of $27y^3 + 125z^3$?
   A. $(3y + 5z)(9y^2 - 15yz + 25z^2)$
   B. $(3y - 5z)(9y^2 + 15yz + 25z^2)$
   C. $(3y + 5z)(9y^2 + 15yz + 25z^2)$
   D. $(3y - 5z)(9y^2 - 15yz + 25z^2)$ (C)

Explanation: This is the sum of cubes identity, and it factors as $(3y + 5z)(9y^2 + 15yz + 25z^2)$

8. What is the factorized form of $64m^3 - 343n^3$?
   A. $(4m - 7n)(16m^2 + 28mn + 49n^2)$
   B. $(4m + 7n)(16m^2 - 28mn + 49n^2)$
   C. $(4m - 7n)(16m^2 - 28mn + 49n^2)$
   D. $(4m + 7n)(16m^2 + 28mn + 49n^2)$ (A)

Explanation: The expression is a difference of cubes, and it factors as $(4m - 7n)(16m^2 + 28mn + 49n^2)$

9. What is the factorized form of $27x^3 + y^3 + z^3 - 9xyz$?
   A. $(x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$
   B. $(x + y + z)(x^2 - y^2 + z^2 - xy + yz + zx)$
   C. $(x - y + z)(x^2 + y^2 + z^2- xy - yz - zx)$
   D. $(x + y - z)(x^2 + y^2 + z^2 - xy - yz - zx)$ (A)

Explanation: This is the factorization of the sum of cubes formula, which is factored as $(x+y+z)(x^2 + y^2 + z^2 -xy-yz – zx)$

10. What is the expanded form of $(x + y + z)^3$?
    A. $x + y + z + 3x^2y + 3xy^2 + 3x^2z + 3xz+ 3yz + 3yz + 6xyz$
    B. $x^2 + y^2 + z^3 + 3x^2y + 3xy^2 + 3x^2z + 3xz^2 + 3y^2z + 3yz^2$
    C. $x^3 + y^2 + z^2 + 3x^2y + 3xy^2 + 3x^2 z + 3xz^2 + 3y^2z$
    D. $x^3 + y^3 + z^3 + 3x^2y + 3xy^2 + 3xz^2 + 3yz^2$ (A)

Explanation: The expansion of (x + y + z) ^ 2 involves the cube of each term, as well as the cross products. The result is $x^2 + y + z + 3x^2y + 3xy^2 + 3x^2z + 3xz^2 + 3y^2z + 3yz^2$