

## CHAPTER-2 | Polynomials

### QUIZ PART-18

1. Which of the following verifies the identity for  $x^3 + y^3 + z^3 = (x+y+z)(x^2 + y^2 + z^2 - xy - yz - zx)$ ?
- A.  $(x+y+z)^3 = x^3 + y^3 + z^3 + 3xyz$   
 B.  $(x+y+z)^3 = x^3 + y^3 + z^3 - 3xyz$   
 C.  $x^3 + y^3 + z^3 = (x+y)(y+z)(z+x)$   
 D. None of the above (B)

**Explanation:** This identity is verified using the expansion of  $(x + y + z)^3$ , where we get  $x^3 + y^3 + z^3 - 3xyz$  as the result

2. If  $x + y + z = 0$  what is the value of  $x^3 + y^3 + z^3$ ?
- A. 0  
 B.  $3xyz$   
 C.  $x + y + z$   
 D.  $x^2 + y^2 + z^2$  (B)

**Explanation:** The identity for  $x^3 + y^3 + z^3 = 3xyz$  holds true if  $x + y + z = 0$  which can be shown by substituting

3. What is the result of evaluating  $(-12)^3 + (7)^3 + (5)^3$  without direct multiplication?
- A. 0  
 B. 1223  
 C. -1223  
 D. 0, as the sum of cubes equals zero (A)

**Explanation:** By using the identity for the sum of cubes, we find that  $(-12)^3 + 7^3 + 5^3 = 0$  due to the balancing of positive and negative

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

**Explanation:** The expanded form of  $(x + y + z)^2$  is the sum of the squares of the individual terms twice the product of each pair of terms

5. How do you factorize  $27x^3 + y^3 + z^3 - 9xyz$ ?
- 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 sum of cubes formula, where  $27y^3 + 125z^3$  can be factored as  $(3y + 5z)(9y^2 + 15yz + 25z^2)$

6. 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.  $(3y + 5z)(9y^2 + 25z^2)$  (A)

**Explanation:** This is the sum of cubes formula, where  $27y^3 + 125z^3$  can be factored as  $(3y + 5z)(9y^2 + 15yz + 25z^2)$

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

**Explanation:** Expanding  $(x + y)(x + z)$  gives  $x^2 + xy + xz + yz$

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:** This is the difference of cubes formula. We can factor  $64m^3 - 343n^3$  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.  $(x - y + z)(x^2 - xy + z^2)$   
 C.  $(x + y)(x^2 + y^2 + z^2 - xy - yz)$   
 D.  $(x + y + z)(x^2 + y^2 + z^2 + xy + yz)$  (A)

**Explanation:** The factorized form of  $27x^3 + y^3 + z^3 - 9xyz$  is  $(x + y + z)(x^2 + y^2 + z^2 - xy - yz - zx)$ , a sum of cubes formula.

10. What is the expanded form of  $(x + 2y + 4z)^2$ ?
- A.  $x^2 + 4y^2 + 16z^2 + 4xy + 8xz + 8yz$   
 B.  $x^2 + 4y^2 + 16z^2 + 6xy + 6xz + 6yz$   
 C.  $x^2 + 4y^2 + 16z^2 + 4xy + 6xz + 8yz$   
 D.  $x^2 + 4y^2 + 16z^2 + 4xy + 8xz + 6yz$  (A)

**Explanation:** Expanding  $(x + 2y + 4z)^2$  gives  $x^2 + y^2 + 16z^2 + 4xy + 8xz + 8yz$