

1. $\sqrt{2}$ is a polynomial of degree
 (a) 2 (b) 0 (c) 1 (d) $\frac{1}{2}$
2. If $f(x) = x + 3$, then $f(x) + f(-x)$ is equal to
 (a) 3 (b) $2x$ (c) 0 (d) 6
3. If $f(x) = x^2 - 2\sqrt{2}x + 1$, then $f(2\sqrt{2})$ is equal to
 (a) 0 (b) 1 (c) $4\sqrt{2}$ (d) $8\sqrt{2} + 1$
4. If $x^2 + kx + 6 = (x + 2)(x + 3)$ for all x , then the value of k is
 (a) 1 (b) -1 (c) 5 (d) 3
5. If $x^{51} + 51$ is divided by $x + 1$, the remainder is
 (a) 0 (b) 1 (c) 49 (d) 50
6. The value of k for which $x - 1$ is a factor of $4x^3 + 3x^2 - 4x + k$, is
 (a) 3 (b) 1 (c) -2 (d) -3
7. If $x + 2$ and $x - 1$ are the factors of $x^3 + 10x^2 + mx + n$, then the values of m and n are respectively
 (a) 5 and -3 (b) 17 and -8 (c) 7 and -18 (d) 23 and -19
8. If both $x - 2$ and $x - \frac{1}{2}$ are factors of $px^2 + 5x + r$, then
 (a) $p = r$ (b) $p + r = 0$ (c) $2p + r = 0$ (d) $p + 2r = 0$
9. If $\frac{x}{y} + \frac{y}{x} = -1$ ($x, y \neq 0$), then the value of $x^3 - y^3$ is
 (a) 1 (b) -1 (c) 0 (d) $\frac{1}{2}$
10. Which of the following is a factor of $(x + y)^3 - (x^3 + y^3)$?
 (a) $x^2 + y^2 + 2xy$ (b) $x^2 + y^2 - xy$ (c) xy^2 (d) $3xy$
11. If $a + b + c = 0$, then $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} =$
 (a) 1 (b) 0 (c) -1 (d) 3
12. If $x = 2y + 6$, then $x^3 - 8y^3 - 36xy =$
 (a) 216 (b) -216 (c) 36 (d) -36
13. The expression $(a - b)^3 + (b - c)^3 + (c - a)^3$ can be factorized as
 (a) $(a - b)(b - c)(c - a)$ (b) $3(a - b)(b - c)(c - a)$
 (c) $-3(a - b)(b - c)(c - a)$ (d) $(a + b + c)(a^2 + b^2 + c^2 - ab - bc - ca)$
14. If a, b, c are natural numbers such that $a^2 + b^2 + c^2 = 29$ and $ab + bc + ca = 26$, and $a + b + c =$ _____.
 (a) 9 (b) 6 (c) 7 (d) 10

15. If $9x^2 - b = \left(3x + \frac{1}{2}\right)\left(3x - \frac{1}{2}\right)$, then the value of b is
 (a) 0 (b) $\frac{1}{\sqrt{2}}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$
16. The coefficient of x in $(x+3)^3$ is
 (a) 1 (b) 9 (c) 18 (d) 27
17. If $x^3 + \frac{1}{x^3} = 110$, then $x + \frac{1}{x} =$
 (a) 5 (b) 10 (c) 15 (d) none of these
18. If $x^3 - \frac{1}{x^3} = 14$, then $x - \frac{1}{x} =$
 (a) 5 (b) 4 (c) 3 (d) 2
19. If $x + \frac{1}{x} = 5$, then $x^2 + \frac{1}{x^2} =$
 (a) 25 (b) 10 (c) 23 (d) 27
20. If $x + \frac{1}{x} = 4$, then $x^4 + \frac{1}{x^4} =$
 (a) 196 (b) 194 (c) 192 (d) 190
21. If $a+b=8$ and $ab=12$, then $a^3+b^3 =$
 (a) 244 (b) 224 (c) 144 (d) 284
22. If $a+b+c=0$, then $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} =$
 (a) 0 (b) 1 (c) -1 (d) 3
23. If $a^{1/3} + b^{1/3} + c^{1/3} = 0$, then
 (a) $a+b+c=0$ (b) $(a+b+c)^3 = 27abc$
 (c) $a+b+c=3abc$ (d) $a^3+b^3+c^3=0$
24.
$$\frac{(a^2-b^2)^3 + (b^2-c^2)^3 + (c^2-a^2)^3}{(a-b)^3 + (b-c)^3 + (c-a)^3} =$$

 (a) $3(a+b)(b+c)(c+a)$ (b) $3(a-b)(b-c)(c-a)$
 (c) $(a-b)(b-c)(c-a)$ (d) $(a+b)(b+c)(c+a)$