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==== An IIT / PMT / MBA / CA / IAS Foundation ====

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FACTORIZATION

KEY Prac- Sheet 1

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|--------------------------------------|--|--|
| 1. $(a + b)(x + y + z)$ | 2. $8x^2y^2(a + b)^2(y + 3x - 2xy)$ | 3. $(a + b)(x + y)$ |
| 4. $(x + 1)(y - 1)$ | 5. $(x + y)(5 + p)$ | 6. $(x + y)(x + y - 4)$ |
| 7. $(xy + 1)(xy - yz + xz)$ | 8. $(a + 1)(a^3 + 1)$ | 9. $(x + a)(x + b)$ |
| 10. $(al - bm)(bl - am)$ | 11. $(ax + y)(ay + x)$ | 12. $(bx - ay)(ab - xy)$ |
| 13. $\left(x + \frac{1}{2}\right)^2$ | 14. 1 | 15. 12.25 |
| 16. 25 | 17. $\left(5x + \frac{1}{2x}\right)\left(5x - \frac{1}{2x}\right)$ | 18. $(1 + a)(1 - a)(1 + a^2)(1 + a^4)$ |
| 19. $3(2x + 3y)(2x - 3y)$ | 20. $3\left(x + \frac{2}{x}\right)\left(x - \frac{2}{x}\right)$ | 21. $3(3x + 8y)(2y - x)$ |
| 22. $5(x - y - z)(x + y + z)$ | 23. $15y(2x + y)$ | 24. $(a - 2b)(a - 2b + 1)(a - 2b - 1)$ |
| 25. $(x + a)(x + a + 1)(x + a - 1)$ | | |

KEY Prac- Sheet 2

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|---------------------------------------|--------------------------------------|--------------------------------|
| 1. $(x - 2y + p - q)(x - 2y - p + q)$ | 2. 0.36 | 3. 3.92 |
| 4. $(x - 3)(x - 16)$ | 5. $(x + 7)(x - 1)$ | 6. $(x + 5)(x - 17)$ |
| 7. $(x + 6)(x - 7)$ | 8. $(p + 4q)(p - 16q)$ | 9. $(x^2 - 10y^2)(x^2 + 6y^2)$ |
| 10. $(x^2 - 15y^2)(x^2 + 8y^2)$ | 11. $(x^2 - x + 6)(x^2 - x + 2)$ | 12. $(x - 22)(x - 1)$ |
| 13. $(3y + 4)(4y - 3)$ | 14. $(x^2 + 3)(9x^2 + 5)$ | 15. $(13y - 11)(3y + 2)$ |
| 16. $(x - 3)(3x - 1)$ | 17. $(3x + 3y + 2)(3x + 3y + 7)$ | 18. $k = 9$ |
| 19. $3xyz(x + 2y - 4z)$ | 20. $\left(\frac{x}{2} - y\right)^2$ | 21. $(y + x + 1)(y - x - 1)$ |
| 22. $(18x + 19a)(29a - 2x)$ | 23. $(2p - 6q + 6x)(2p - 6q - 6x)$ | |
| 24. $28a^2$ | 25. $5(2p^2 + 3q^2)(2p^2 - 3q^2)$ | |

KEY Prac- Sheet 3

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|---|--|
| 1. $(x^2 + y^2)(p^2 + q^2)$ | 2. $12x^2 - 27y^2$ |
| 3. $(5x - y)(7x^2 - 10xy + 19y^2)$ | 4. $(2a - 3b^2)(4a^2 + 6ab^2 + 9b^4)$ |
| 5. $2(x - y)(x^2 + xy + y^2)(4x^6 - 2x^3y^3 + y^6)$ | 6. $(a - b - x)(a^2 + ab + b^2)$ |
| 7. Expression = $(x)^3 + (2y)^3 + (3z)^3 - 3(x)(2y)(3z)$
= $(x + 2y + 3z)(x^2 + 4y^2 + 9z^2 - 2xy - 6yz - 3xz)$ | 8. $a^3 - 8b^3 - 64c^3 - 24abc$
= $(a)^3 + (-2b)^3 + (-4c)^3 - 3(a)(-2b)(-4c)$
= $(a - 2b - 4c)(a^2 + 4b^2 + 16c^2 + 2ab + 4ac - 8bc)$ |
| 9. Let $x - 2y = a$, $3y - 2z = b$, $2z - y - x = c$
Then $a + b + c = x - 2y + 3y - 2z + 2z - y - x = 0$
\therefore expression = $a^3 + b^3 + c^3 = 3abc$ ($\because a + b + c = 0$).
Substituting the values
$(x - 2y)^3 + (3y - 2z)^3 + (2z - y - x)^3 = 3(x - 2y)(3y - 2z)(2z - y - x)$ | 10. $= \left(a + 2 + \frac{1}{a}\right)\left(a^2 - 2a + 3 - \frac{2}{a} + \frac{1}{a^2}\right)$ |
| 12. $3(x - y)(y - z)(z - x).xyz$ | 11. $(x + y - 3z)(x^2 + y^2 + 9z^2 - xy + 3xz + 3yz)$ |
| 14. $\left(2x + \frac{3}{2x} + 2\right)\left(4x^2 + \frac{9}{4x^2} + 1 - \frac{3}{x} - 4x\right)$ | 13. $= \left(a - \frac{1}{a} + 1\right)\left(a^2 + \frac{1}{a^2} + 2 + \frac{1}{a} - a\right)$ |
| 16. $(x - 2)(x + 3)(x - 4)$ | 15. $(x + 3)(x^2 - 3x + 4)$ |
| 18. $c = 15$ | 17. $(x + 2)(x^2 - 2x - 5)$ |
| 19. $= (xy + xz + yz)(x + y + z)$ | 20. $-(b - c)(c - a)(a - b)(bc + ac + ab)$ |
| 21. $2(ab + bc + ca)$ | 22. $(x - 3y + 4)(x + y - 2)$ |
| 23. $(x + 2y - 3)(x + 6y - 5)$ | 24. $(3x - 2y - 2)(2x - 3y + 4)$ |
| 25. $(2a^2 - a + 1)(4a^4 + 2a^3 - a^2 + a + 1)$ | 26. $(x - 5y)(x - y)^2$ |