



Attempt questions first; check the separate key afterward. Show all working. Draw accurate figures where required.

A. Very short answers - 1 mark each

1. Expand $(x+4)^2$.
2. Expand $(2x-3)^2$.
3. Expand $(a+b)(a-b)$.
4. Expand $(x+2)(x+7)$.
5. Evaluate 102^2 using an identity.
6. Evaluate 97×103 using an identity.
7. Factorise $x^2+10x+25$.
8. Factorise $9a^2-16b^2$.

B. Short answers / practice - 2 marks each

9. Expand $(x+y+z)^2$.
10. Expand $(a+b)^3$.
11. Expand $(2x-1)^3$.
12. Factorise x^3-8 .
13. Factorise a^3+b^3 .
14. Factorise $27x^3+1$.
15. If $x+y=8$ and $xy=12$, find x^2+y^2 .
16. Find $(x-y)^2$.
17. If $a-b=5$ and $ab=6$, find a^2+b^2 .
18. Find a^3-b^3 .
19. If $x+1/x=5$, find x^2+1/x^2 .
20. Find x^3+1/x^3 .

C. Application / reasoning - 3 marks each

21. Factorise $x^2-7x+12$.
22. Factorise $2x^2+7x+3$.

23. Simplify $(x+3)^2-(x-3)^2$.
24. Simplify $(a+b)^2+(a-b)^2$.
25. Prove $(a+b+c)^2$ using an area or algebraic argument.
26. If $a+b+c=0$, show $a^3+b^3+c^3=3abc$.
27. Factorise $8x^3-27$.
28. If $a+b=10$ and $ab=21$, find a^3+b^3 .
29. Expand $(x-y-z)^2$.
30. Calculate 100^2-99^2 using an identity.
31. If $x-1/x=3$, find x^2+1/x^2 and $(x+1/x)^2$.
- D. Extended practice - 5 marks per pair**
32. Evaluate 1001^3 using an identity.
33. Find 49^2+51^2 without squaring separately.
34. A square's side rises from x to $x+5$. Express the extra area.
35. Factorise $x^3+y^3+z^3-3xyz$ and state when it is zero.

ANSWER KEY - Numerical / closed questions

1) $x^2+8x+16$. 2) $4x^2-12x+9$. 3) a^2-b^2 . 4) $x^2+9x+14$. 5) 10404. 6) 9991. 7) $(x+5)^2$. 8) $(3a-4b)(3a+4b)$. 9) $x^2+y^2+z^2+2xy+2yz+2zx$. 10) $a^3+3a^2b+3ab^2+b^3$. 11) $8x^3-12x^2+6x-1$. 12) $(x-2)(x^2+2x+4)$. 13) $(a+b)(a^2-ab+b^2)$. 14) $(3x+1)(9x^2-3x+1)$. 15) 40. 16) 16. 17) 37. 18) 215. 19) 23. 20) 110. 21) $(x-3)(x-4)$. 22) $(2x+1)(x+3)$. 23) $12x$. 24) $2(a^2+b^2)$. 27) $(2x-3)(4x^2+6x+9)$. 28) 370. 29) $x^2+y^2+z^2-2xy-2xz+2yz$. 30) 199. 31) 11;13. 32) 1003003001. 33) 5002. 34) $10x+25$. 35) $(x+y+z)(x^2+y^2+z^2-xy-yz-zx)$; zero if $\text{sum}=0$ or $x=y=z$ for real values.