

1. Simplify:  $\frac{(a^2-b^2)^3+(b^2-c^2)^3+(c^2-a^2)^3}{(a-b)^3+(b-c)^3+(c-a)^3}$
2. Prove that:  
 $2x^3 + 2y^3 + 2z^3 - 6xyz = (x + y + z)[(x - y)^2 + (y - z)^2 + (z - x)^2]$ .  
Hence evaluate:  
 $2(13)^3 + 2(14)^3 + 2(15)^3 - 6 \times 13 \times 14 \times 15$
3. Factorise:  $4x^3 + 20x^2 + 3x + 18$
4. Find the values of  $a$  and  $b$ , if  $x^2 - 4$  is a factor of  $ax^4 + 2x^3 - 3x^2 + bx - 4$  and hence factorise it completely.
5. Find the value of  $x^2 + \frac{1}{x^2}$ , if  $x - \frac{1}{x} = \sqrt{3}$
6. Factorise:  $216x^3 + \frac{1}{125}$
7. Factorise:  $125x^3 - 27y^3 + z^3 + 45xyz$
8. Factorise:  $x^3 + 3x^2y + 3xy^2 + y^3 - 8$
9. Polynomials  $kx^3 + 3x^2 - 3$  and  $2x^3 - 5x + k$ , when divide by  $(x - 4)$  leaves the same remainder in each case. Find the value of  $k$ .
10. Factorise:  $x^3 + 13x^2 + 32x + 20$