

1. Check if the polynomial  $q(t) = 4t^3 + 4t^2 - t - 1$  is exactly divisible by  $2t + 1$ .
2. Evaluate  $93 \times 107$  without multiplying directly.
3. If  $a, b, c$  are all non-zero and  $a + b + c = 0$ , prove that:  $\frac{a^2}{bc} + \frac{b^2}{ca} + \frac{c^2}{ab} = 3$
4. Find the value of  $k$  so that  $(2x - 1)$  be the factor of  $8x^4 + 4x^3 - 16x^2 + 10 + k$ .
5. If  $p(x) = x^2 - 4x + 3$ , evaluate  $p(2) - p(-1) + p\left(\frac{1}{2}\right)$
6. Factorise:  $x^3 - 8x^2 + 17x - 10$
7. Factorise:  $8(x + y)^3 + 27(x - y)^3$
8. Let  $S_1$  and  $S_2$  are the remainder when a polynomial  $x^3 + 2x^2 - 5ax - 7$  and  $x^3 + ax^2 - 12x + 6$  are divided by  $(x + 1)$  and  $(x - 2)$  respectively. If  $2S_1 - S_2 = 10$ , find the value of  $a$ .