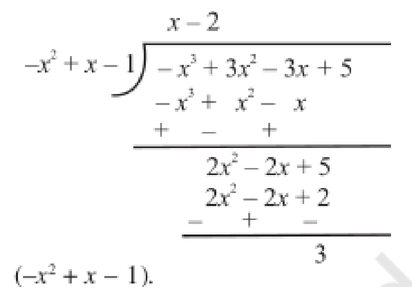
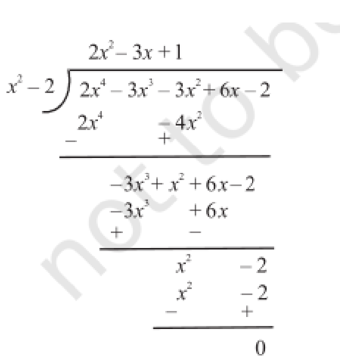
**Example 8 :** Divide $3x^2 - x^3 - 3x + 5$ by $x - 1 - x^2$.
**Solution :** Note that the given polynomials are not in standard form. To carry out division, we first write both the dividend and divisor in decreasing orders of their degrees.So, dividend= $-x^3 + 3x^2 - 3x + 5$ and divisor= $-x2 + x - 1$.
Division process is shown on the right side.
We stop here since degree $(3) = 0 < 2 =$ degree $(-x^2 + x - 1)$.So, quotient= $x - 2$, remainder $= 3$.
Now,



$$\begin{aligned}&\text{Divisor} \times \text{Quotient} + \text{Remainder}\\ &= (-x^2 + x - 1)(x - 2) + 3\\ &= -x^3 + 3x^2 - 3x + 2 + 3\\ &= -x^3 + 3x^2 - 3x + 5\\ &= \text{Dividend}\end{aligned}$$

In this way, the division algorithm is verified.

**Example 9 :** Find all the zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$ , if you know two of the zeroes are $\sqrt{2}$ and $\sqrt{-2}$.
**Solution :** Since two of the zeroes are $\sqrt{2}$ and $-\sqrt{2}$, $(x - \sqrt{2})(x + \sqrt{2}) = x^2 - 2$ is a factor of the given polynomial.



First term of the quotient is $\frac{2x^4}{x^2} = 2x^2$

Second term of the quotient is $\frac{-3x^3}{x^2} = -3x$

Third term of the quotient is $\frac{x^2}{x^2} = 1$