④ let $p(x) = x^3 - 3x^2 + x + 2$

$q(x) = x - 2$

$r(x) = -2x + 4$

$p(x) = g(x)\,q(x) + r(x)$ [div. algo. for poly.]

$x^3 - 3x^2 + x + 2 = g(x)\,[x-2] + (-2x+4)$

$\Rightarrow g(x) = \dfrac{x^3 - 3x^2 + x + 2 + 2x - 4}{x-2}$

$= \dfrac{x^3 - 3x^2 + 3x - 2}{x-2}$

$$
\begin{array}{r|l}
 & x^2 - x + 1 \\
\hline
x-2 & x^3 - 3x^2 + 3x - 2 \\
 & x^3 - 2x^2 \\
 & \hline
 & -x^2 + 3x - 2 \\
 & -x^2 + 2x \\
 & \hline
 & x - 2 \\
 & x - 2 \\
 & \hline
 & 0
\end{array}
$$

$\therefore g(x) = x^2 - x + 1$

5① degree $p(x)$ = degree $q(x)$

$p(x) = 2x^2 - 4$

$g(x) = 2$

$\therefore q(x) = x^2 - 2$

$$
\begin{array}{r|l}
 & x^2 - 2 \\
\hline
2 & 2x^2 - 4 \\
 & 2x^2 \\
 & \hline
 & -4 \\
 & -4 \\
 & \hline
 & 0
\end{array}
$$

deg $p(x)$ = degree $q(x)$ [each 2]