

5. $x^2 - 2x^2 + x - 2$
 6. $x^2 + 3x^2 + x + 3$
 (5, 0)
 $(x^2 - 2x^2 + x - 2) : (x^2 + 3x^2 + x + 3) = 1$
 $-(x^2 + 3x^2 + x + 3)$
 $4x - 5$
 $4x - 5$
 $(x^2 + 3x^2 + x + 3) : (x^2 + 1) = x + 3$
 $-(x^2 + x)$
 $3x^2 + 3$
 $3x^2 + 3$
 0
 (2x) | 5
 (2x) | 9
 $(x^2 + 3x^2 + x + 3) : (x^2 + 1) = x + 3$
 $(x^2 - 2x^2 + x - 2) : (x^2 + 1) = x - 2$
 $-(x^2 + x)$
 $-2x^2 - 2$
 0

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$Z_3[x]$
 $(2x^5 + x^4 + x + 2) : (x^3 + 2x^2 + x + 2) = 2x$
 $-(2x^5 + x^4 + 2x^3 + x^2)$
 $nk: (x^3 - x^2 + x + 2)$
 $(x^4 + 2x^3 + x^2 + 2x) : (x^3 - x^2 + x + 2) = x$
 $-(x^4 - x^3 + x^2 + 2x)$
 0

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$x^4 + 2x^3 + 3x^2 + 2x + 1 = 0 \quad /: x^2$
 0) Sub:
 $(x^2 + 2x + 3) + \frac{2}{x} + \frac{1}{x^2} = 0$
 $x + \frac{1}{x} = y \quad / \cdot 2$
 $2x + 2x \cdot \frac{1}{x} + \frac{1}{x^2} = y^2$
 $2x + \frac{1}{x} = y^2 - 2$
 $y^2 - 2 + 2y + 3 = 0$
 $y^2 + 2y + 1 = 0$
 $(y + 1)^2 = 0$
 $y = -1 \quad 2 \text{ kds.}$
 i) $x + \frac{1}{x} = -1 \quad / \cdot x$
 $x^2 + x + 1 = 0$
 $x_{1,2} = \frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm i\sqrt{3}}{2}$

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ii) $x^4 + 2x^3 + 3x^2 + 2x + 1 = 0 \quad /: x^2$
 $(x^2 + 2x + 3) + \frac{2}{x} + \frac{1}{x^2} = 0$
 $y = x + \frac{1}{x}$
 $y^2 - 2 + 2y + 3 = 0$
 $y^2 + 2y + 1 = 0$
 $(y + 1)^2 = 0$
 $y = -1$
 $x + \frac{1}{x} = -1$
 $x^2 + x + 1 = 0$
 $x_{1,2} = \frac{-1 \pm \sqrt{1-4}}{2} = \frac{-1 \pm i\sqrt{3}}{2}$
 $x^2 - (1+i)x + 1 = 0$
 $D = (1+i)^2 - 4 = 1 + 2i - 4 = 2i - 3$
 $x_{1,2} = \frac{1+i \pm \sqrt{2i-3}}{2}$

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$D = 2i - 4$
 $\sqrt{D} = \sqrt{2i-4} = \sqrt{2} \cdot \sqrt{i-2}$
 $\sqrt{i-2} = a + bi \quad / \cdot 2$
 $i-2 = a^2 + 2abi - b^2$
 $-2 = a^2 - b^2$
 $+1 = 2ab \Rightarrow a = \frac{1}{2b}$
 $-2 = \frac{1}{4b^2} - b^2 \quad / \cdot 4b^2$
 $-8b^2 = 1 - 4b^4$
 $4b^4 - 8b^2 - 1 = 0 \quad 2b^2 = y$
 $2y^2 - 4y - 1 = 0$
 $y = \frac{4 \pm \sqrt{16+8}}{4} = \frac{4 \pm 2\sqrt{5}}{4} = \frac{2 \pm \sqrt{5}}{2}$
 $\nabla 2b^2 = 2 + \sqrt{5} \quad \nabla$
 $b = 1 + \frac{\sqrt{5}}{2}$
 $b = \pm \sqrt{1 + \frac{\sqrt{5}}{2}}$
 $a = \pm \frac{1}{2(1 + \frac{\sqrt{5}}{2})}$
 ∇

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