Quiz 6

① Galileo Galilei ; 1638

② Descartes ; 1637

③ Isaac Newton & Gotfried Leibniz
- Newton discovered it first
- Published it first
Goffried

④ $x^3 + 6x - 7 = 0$

$x = u + v \Rightarrow (u+v)^3 - 6(u+v) - 7 = 0$

$= u^3 + 3u^2v + 3uv^2 + v^3 - 6(u+v) - 7 = 0$

$= u^3 + v^3 + [3uv(u+v) - 6(u+v)] - 7 = 0$

$= u^3 + v^3 + (u+v)(3uv - 6) - 7 = 0$

set $3uv - 6 = 0 \Rightarrow uv = 2$ $\Rightarrow$ $u^3 + v^3 = 7$, $u^3 v^3 = 8$

$X^2 - 7X + 8 = 0$

$\Rightarrow \frac{7 \pm \sqrt{49 - 32}}{2} = \frac{7 \pm \sqrt{17}}{2}$

$u^3 = \frac{7 + \sqrt{17}}{2} \Rightarrow u = \sqrt[3]{\frac{7+\sqrt{17}}{2}}$

$v^3 = \frac{7 - \sqrt{17}}{2} \Rightarrow v = \sqrt[3]{\frac{7-\sqrt{17}}{2}}$

$x_1 = u + v = \sqrt[3]{\frac{7+\sqrt{17}}{2}} + \sqrt[3]{\frac{7-\sqrt{17}}{2}}$

$x_2 = \frac{-1 + \sqrt{3}i}{2} \cdot \sqrt[3]{\frac{7+\sqrt{17}}{2}} + \frac{-1 - \sqrt{3}i}{2}$

$x_3 = \frac{-1 - \sqrt{3}i}{2} \cdot \sqrt[3]{\frac{7+\sqrt{17}}{2}} + \frac{-1 + \sqrt{3}i}{2} \cdot \sqrt[3]{\frac{7-\sqrt{17}}{2}}$