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Quiz 6

- 1) Galileo Galilei, 1638
- 2) Descartes, 1637
- 3) Newton & Leibniz, Newton, Leibniz

4) $x^3 + 6x - 7 = 0$

$$x = u + v$$

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

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

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

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

$$3uv + 6 = 0$$

$$\boxed{uv = -2} \rightarrow u^3v^3 = -8$$

$$u^3 + v^3 - 7 = 0$$

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

$$(x+1)(x-8) = 0$$

$$x = -1 \quad x = 8$$

$$\text{Root 1: } -1 + 8 = 7$$

$$\text{Root 2: } -1\left(-\frac{1}{2} + \frac{i\sqrt{3}}{2}\right) + 8\left(-\frac{1}{2} - \frac{i\sqrt{3}}{2}\right) = -\frac{7}{2} - \frac{9\sqrt{3}i}{2}$$

$$\text{Root 3: } 8\left(-\frac{1}{2} + \frac{i\sqrt{3}}{2}\right) - 1\left(-\frac{1}{2} - \frac{i\sqrt{3}}{2}\right) = -\frac{7}{2} + \frac{9\sqrt{3}i}{2}$$