Sarah Catonic Quiz 6 10/20/2021

1. Galileo in 1620
2. Descartes in 1650
3. Newton and Leibniz. Newton discovered it first, but Leibniz was the first to publish it.
4. $x^3+6x-7=0 \qquad x=u+v$

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

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

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

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

Wishful thinking make $(u+v)(3uv+6)=0$

so $3uv+6=0 \rightarrow uv=-2$ so $u^3v^3=-8$

What's left: $u^3+v^3-7=0 \Rightarrow u^3+v^3=7$

$z^2-7z-8=0$

$(z-8)(z+1)=0 \qquad u^3=8$ and $v^3=-1$

$z=8,\ z=-1 \qquad$ so $u=2$ and $v=-1$

so $x=2-1=1$ is one root

To find the other two roots:

$$
\begin{array}{r}
x^2+x+7 \\
(x-1)\,\overline{)\,x^3+6x-7} \\
-x^3+x^2 \\
\hline
x^2+6x-7 \\
x^2-x \\
\hline
7x-7 \\
-7x+7 \\
\hline
0
\end{array}
$$

it would be the roots of the equation x^2+x+7

Using the quadratic formula:

$$\frac{-1\pm\sqrt{1^2-4(1)(7)}}{2(1)}=\frac{-1\pm\sqrt{-27}}{2}$$

$\dfrac{-1\pm i3\sqrt{3}}{2}$ are the other two roots.