Problem 24: The equation $z^6 + z^3 + 1 = 0$ has one complex root with argument (angle) θ between $90°$ and $180°$ in the complex plane. Determine the degree measure of θ. (Source: AIME)

Let $u = z^3$. Then $u^2 + u + 1 = 0$.

$$
\begin{aligned}
u &= \frac{-1 \pm \sqrt{1-4}}{2} \\
&= \frac{-1 \pm \sqrt{-3}}{2} \\
&= -\frac{1}{2} \pm \frac{\sqrt{3}}{2}i
\end{aligned}
$$

Putting u in exponential form, we get

$$
u = \{e^{2\pi i/3}, e^{4\pi i/3}\}
$$

Now we can solve for z.

$$
\begin{aligned}
z^3 = e^{2\pi i/3} &\implies z = \{e^{2\pi i/9}, e^{8\pi i/9}, e^{14\pi i/9}\} \\
z^3 = e^{4\pi i/3} &\implies z = \{e^{4\pi i/9}, e^{10\pi i/9}, e^{16\pi i/9}\}
\end{aligned}
$$

Combining all six solutions, we have

$$
z = \{e^{2\pi i/9}, e^{4\pi i/9}, e^{8\pi i/9}, e^{10\pi i/9}, e^{14\pi i/9}, e^{16\pi i/9}\}
$$

Only one of these roots is between $90°$ and $180°$, and that root is $z = e^{8\pi i/9}$.

The angle measure of $\frac{8\pi}{9}$ radians is equivalent to $160°$.

Thus $\boxed{\theta = 160°}$.