SOLVE $\cos\theta = 2$

$$\cos\theta = \frac{e^{j\theta} + e^{-j\theta}}{2}$$

$$e^{j\theta} = \cos\theta + j\sin\theta$$
$$e^{-j\theta} = \cos\theta - j\sin\theta$$
$$e^{j\theta} + e^{-j\theta} = 2\cos\theta$$

$$2 = \frac{e^{j\theta} + e^{-j\theta}}{2}$$

$$\Rightarrow \quad e^{j\theta} + e^{-j\theta} = 4$$

$$(\times e^{j\theta}) \qquad e^{2j\theta} + 1 = 4e^{j\theta} \quad \Rightarrow \quad e^{2j\theta} - 4e^{j\theta} + 1 = 0$$

(quadratic in $e^{j\theta}$)

$$e^{j\theta} = \frac{4 \pm \sqrt{16 - 4}}{2} = \frac{4 \pm 2\sqrt{3}}{2}$$

$$e^{j\theta} = 2 \pm \sqrt{3}$$

$$j\theta = \ln(2 \pm \sqrt{3}) \quad \Rightarrow \quad \theta = \frac{\ln(2 \pm \sqrt{3})}{j} = -j\ln(2 \pm \sqrt{3})$$

So solution to $\cos\theta = 2$ is

$$\theta = -j\ln(2+\sqrt{3}) \quad \text{or} \quad -j\ln(2-\sqrt{3})$$