zu G2:

a) $|z_1| = \sqrt{(\sqrt{3})^2 + 3^2} = 2\sqrt{3} \Rightarrow z_1 = 2\sqrt{3}\left(-\frac{1}{2} + i\frac{\sqrt{3}}{2}\right)$

Wir brauchen $\varphi \in [0,2\pi[$ mit

$$\cos\varphi = -\frac{1}{2} \quad \text{und} \quad \sin\varphi = \frac{\sqrt{3}}{2} = \sqrt{\frac{3}{4}}$$

$\Leftrightarrow \quad (\varphi = \frac{2}{3}\pi \text{ oder } \varphi = \frac{4}{3}\pi) \text{ und } (\varphi = \frac{1}{3}\pi \text{ oder } \varphi = \frac{2}{3}\pi)$

$\Leftrightarrow \quad \varphi = \frac{2}{3}\pi$

Also gilt: $z_1 = 2\sqrt{3}\left(\cos(\frac{2}{3}\pi) + i\sin(\frac{2}{3}\pi)\right) = 2\sqrt{3} \cdot e^{i\frac{2}{3}\pi}$

$|z_2| = \sqrt{3} \Rightarrow z_2 = \sqrt{3}\left(-\frac{\sqrt{3}}{2} + i\frac{1}{2}\right)$

Suchen $\varphi \in [0,2\pi[$ mit

$\cos\varphi = -\sqrt{\frac{3}{4}} \quad \text{und} \quad \sin\varphi = \frac{1}{2}$

$\Leftrightarrow (\varphi = \frac{5}{6}\pi \text{ o. } \varphi = \frac{7}{6}\pi) \text{ und } (\varphi = \frac{1}{6}\pi \text{ o. } \varphi = \frac{5}{6}\pi)$

$\Leftrightarrow \varphi = \frac{5}{6}\pi$

Also gilt: $z_2 = \sqrt{3}\left(\cos(\frac{5}{6}\pi) + i\sin(\frac{5}{6}\pi)\right) = \sqrt{3}\, e^{i\frac{5}{6}\pi}$

b) $z_3 = 6 \cdot e^{i\frac{3}{2}\pi}$; $z_4 = 2 \cdot e^{-i\frac{1}{6}\pi}$; $z_5 = 729 \cdot e^{i10\pi} = 729$

c) $z_3 = 6 \cdot (\cos(\frac{3}{2}\pi) + i\sin(\frac{3}{2}\pi)) = -6i$

$z_4 = 2\left(\cos(\frac{1}{6}\pi) + i\sin(\frac{1}{6}\pi)\right) = 2 \cdot \sqrt{\frac{3}{4}} + i\,2(-\frac{1}{2}) = \sqrt{3} - i$

$z_5 = 729$