

$$\cdot 12 \quad \bar{z} = r(\cos\theta - i\sin\theta) = r(\cos(-\theta) + i\sin(-\theta)) = r\operatorname{cis}(-\theta)$$

$$\cdot 13 \quad -z = -1 \cdot z = \operatorname{cis}(180) \cdot r\operatorname{cis}\theta = r\operatorname{cis}(\theta + 180^\circ)$$

$$\cdot 14 \quad -\bar{z} = -1 \cdot \bar{z} = \operatorname{cis}(180) \cdot r\operatorname{cis}(-\theta) = r\operatorname{cis}(180 - \theta)$$

$$\cdot 15 \quad z \cdot \bar{z} = r^2 = r^2 \operatorname{cis} 0^\circ$$

$$\cdot 16 \quad |z| = r = r\operatorname{cis} 0^\circ$$

$$\cdot 17 \quad \frac{1}{z} = \frac{\operatorname{cis} 180}{r\operatorname{cis}\theta} = \frac{1}{r} \operatorname{cis}(180 - \theta)$$

$$\cdot 18 \quad \frac{1}{\bar{z}} = \frac{\operatorname{cis} 0^\circ}{r\operatorname{cis}(\theta)} = \frac{1}{r} \operatorname{cis}\theta$$

$$\cdot 19 \quad iz = \operatorname{cis} 90^\circ \cdot r\operatorname{cis}\theta = r\operatorname{cis}(90 + \theta)$$

$$\cdot 20 \quad i\bar{z} = \operatorname{cis} 90^\circ \cdot r\operatorname{cis}(-\theta) = r\operatorname{cis}(90 - \theta)$$

$$\cdot 21 \quad -i\bar{z} = \operatorname{cis} 270^\circ \cdot r\operatorname{cis}(-\theta) = r\operatorname{cis}(270 - \theta)$$

$$\cdot 22 \quad \frac{z}{2} + \frac{\bar{z}}{2} = \frac{1}{2}(z + \bar{z}) = \frac{1}{2} \cdot 2\operatorname{Re}(z) = \operatorname{Re}(z) = r\cos\theta = r\cos\theta \cdot \operatorname{cis} 0^\circ$$

$$\cdot 23 \quad \frac{z}{2} - \frac{\bar{z}}{2} = \frac{1}{2}(z - \bar{z}) = \frac{1}{2} \cdot 2i\operatorname{Im}(z) = i\operatorname{Im}(z) = r\sin\theta = r\sin\theta \cdot \operatorname{cis} 90^\circ$$

$$\cdot 24 \quad \frac{-i}{z} = \frac{\operatorname{cis} 270}{r\operatorname{cis}(-\theta)} = \frac{1}{r} \operatorname{cis}(270 + \theta)$$

$$\cdot 25 \quad \frac{\bar{z}}{z} = \frac{r\operatorname{cis}(-\theta)}{r\operatorname{cis}(\theta)} = \operatorname{cis}(-2\theta)$$

$$\cdot 26 \quad -z^2 = -1 \cdot z \cdot z = \operatorname{cis} 180 \cdot r\operatorname{cis}\theta \cdot r\operatorname{cis}\theta = r^2 \operatorname{cis}(180 + 2\theta)$$