

$$9. \quad z = 3 - 3i$$

$$\textcircled{1} \quad x=3 \quad y=-3$$

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{3^2 + (-3)^2}$$

$$r = \sqrt{9+9}$$

$$r = \sqrt{18}$$

$$r = \sqrt{3 \cdot 3 \cdot 2}$$

$$r = 3\sqrt{2}$$

$$\textcircled{2} \quad \cos \theta = \frac{x}{r} = \frac{3}{3\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\sin \theta = \frac{y}{r} = \frac{-3}{3\sqrt{2}} = -\frac{1}{\sqrt{2}} = -\frac{\sqrt{2}}{2}$$

$$\theta = 315^\circ$$

$$w = -\sqrt{3} + i$$

$$\textcircled{1} \quad x = -\sqrt{3} \quad y = 1$$

$$r = \sqrt{x^2 + y^2}$$

$$r = \sqrt{(-\sqrt{3})^2 + 1^2}$$

$$r = \sqrt{3+1}$$

$$r = \sqrt{4}$$

$$r = 2$$

$$\textcircled{2} \quad \cos \theta = \frac{x}{r} = \frac{-\sqrt{3}}{2}$$

$$\sin \theta = \frac{y}{r} = \frac{1}{2}$$

$$\left(-\frac{\sqrt{3}}{2}, \frac{1}{2}\right)$$

$$\theta = 150^\circ$$

$$z = 3\sqrt{2} (\cos 315^\circ + i \sin 315^\circ)$$

$$w = 2 (\cos 150^\circ + i \sin 150^\circ)$$

$$z \cdot w = 3\sqrt{2} (2) (\cos (315^\circ + 150^\circ) + i \sin (315^\circ + 150^\circ))$$

$$= 6\sqrt{2} (\cos 465^\circ + i \sin 465^\circ)$$

$$= 6\sqrt{2} (\cos (465^\circ - 360^\circ) + i \sin (465^\circ - 360^\circ))$$

$$= \boxed{6\sqrt{2} (\cos 105^\circ + i \sin 105^\circ)}$$

$$\frac{z}{w} = \frac{3\sqrt{2}}{2} (\cos (315^\circ - 150^\circ) + i \sin (315^\circ - 150^\circ))$$

$$= \boxed{\frac{3\sqrt{2}}{2} (\cos 165^\circ + i \sin 165^\circ)}$$