

$$x^2 = 4$$

$$x = \pm 2,$$

$$(2)^2 = 4, (-2)^2 = 4$$

$$i \quad (-i)$$

$$\begin{array}{l} i^2 \quad (-i)^2 \\ = -1 \quad (-1) i^2 \\ \quad \quad = i^2 \\ \quad \quad = -1 \end{array}$$

$$\sqrt{5} i^x = i \sqrt{5}$$

$$a^2 - b^2 = (a+b)(a-b)$$

conjugate

$$b^2 = i^2 = \underline{-1}$$

$$\begin{aligned} 2 \operatorname{cis} 0 &= 2(\cos 0 + i \sin 0) \\ &= 2(1 + i \cancel{0}) \\ &= 2 \times 1 = \underline{2}. \end{aligned}$$

$$\begin{aligned} 2 \operatorname{cis} 90 &= 2(\cos 90 + i \sin 90) \\ &= 2(0 + i \times 1) \\ &= 2i \end{aligned}$$

$$\begin{aligned} r \operatorname{cis} \theta &= r(\cos \theta + i \sin \theta) \\ &= a + bi \end{aligned}$$

$$a = r \cos \theta$$

$$b = r \sin \theta$$

Express  $2 \operatorname{cis}\left(-\frac{3\pi}{4}\right)$  in the form  $a + bi$ .

**Solution**

$$\begin{aligned} \underline{a = r \cos \theta} \\ &= 2 \cos\left(-\frac{3\pi}{4}\right) \\ &= -2 \cos\left(\frac{\pi}{4}\right) \\ &= -2 \times \frac{1}{\sqrt{2}} \\ &= -\sqrt{2} \end{aligned}$$

$$\begin{aligned} \underline{b = r \sin \theta} \\ &= 2 \sin\left(-\frac{3\pi}{4}\right) \\ &= -2 \sin\left(\frac{\pi}{4}\right) \\ &= -2 \times \frac{1}{\sqrt{2}} \\ &= -\sqrt{2} \end{aligned}$$

$$\text{Therefore } 2 \operatorname{cis}\left(-\frac{3\pi}{4}\right) = -\sqrt{2} - \sqrt{2}i$$