

4215

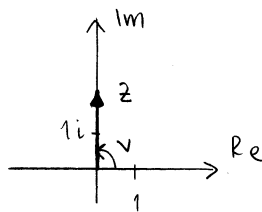
(a)  $z = 2i = 0 + 2i$

Ur figuren ser vi direkt att

$$r = 2, \quad \varphi = \frac{\pi}{2}$$

Alltså:

$$z = 2 \left( \cos \frac{\pi}{2} + i \sin \frac{\pi}{2} \right) \quad (\underline{\underline{\text{Svar}}})$$



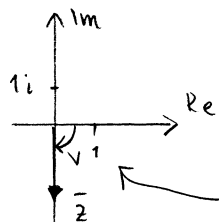
$$\bar{z} = -2i = 0 - 2i$$

Ur figuren ser vi direkt att

$$r = 2, \quad \varphi = -\frac{\pi}{2}$$

Alltså:

$$\bar{z} = 2 \left( \cos \left( -\frac{\pi}{2} \right) + i \sin \left( -\frac{\pi}{2} \right) \right) \quad (\underline{\underline{\text{Svar}}})$$



När vi medlurs från  
reella axeln väkvas  
vinkeln negativ.

Normalt hade  
vi valt  $\varphi = \frac{3\pi}{2}$ ,  
men här skulle ju  
argumentet vara  
i intervallet  $-\pi$   
till  $\pi$ .

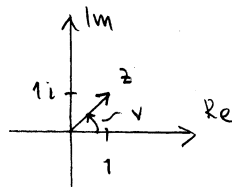
(b)  $z = 1 + i$

$$r = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$\tan \varphi = \frac{1}{1} \Rightarrow \varphi = \frac{\pi}{4}$$

Alltså:

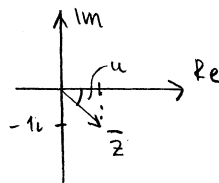
$$z = \sqrt{2} \left( \cos \frac{\pi}{4} + i \sin \frac{\pi}{4} \right) \quad (\underline{\underline{\text{Svar}}})$$



$$\bar{z} = 1 - i$$

$$r = \sqrt{1^2 + 1^2} = \sqrt{2}$$

$$\tan u = \frac{1}{-1} \Rightarrow u = -\frac{\pi}{4}$$



$$\text{Då är } \arg \bar{z} = -\frac{\pi}{4}$$

Alltså:

$$\bar{z} = \sqrt{2} \left( \cos \left( -\frac{\pi}{4} \right) + i \sin \left( -\frac{\pi}{4} \right) \right) \quad (\underline{\underline{\text{Svar}}})$$

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(c)  $z = 3 = 3 + 0i$

(forts)

Ur figuren ser vi direkt att

$$r = 3, \quad \varphi = 0$$

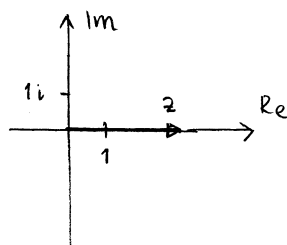
Alltså

$$z = 3(\cos 0 + i \sin 0) \quad (\underline{\underline{\text{Svar}}})$$

$$\bar{z} = 3 \quad (= 3 - 0i)$$

Alltså

$$\bar{z} = 3(\cos 0 + i \sin 0) \quad (\underline{\underline{\text{Svar}}})$$



En reellt tal har sig själv som konjugat

(d)  $z = -2 - 2i$

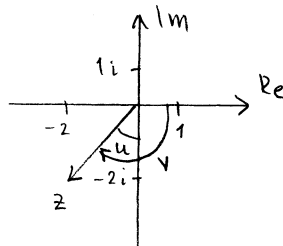
$$r = \sqrt{2^2 + 2^2} = \sqrt{8}$$

$$\tan u = \frac{2}{2} \Rightarrow u = \frac{\pi}{4}$$

$$\text{Då får vi } \varphi = -\frac{\pi}{2} - \frac{\pi}{4} = -\frac{3\pi}{4}$$

Alltså

$$z = \sqrt{8} \left( \cos\left(-\frac{3\pi}{4}\right) + i \sin\left(-\frac{3\pi}{4}\right) \right) \quad (\underline{\underline{\text{Svar}}})$$



$$\bar{z} = -2 + 2i$$

$$r = \sqrt{2^2 + 2^2} = \sqrt{8}$$

$$\tan u = \frac{2}{2} \Rightarrow u = \frac{\pi}{4}$$

$$\text{Då får vi } \varphi = \frac{\pi}{2} + \frac{\pi}{4} = \frac{3\pi}{4}$$

$$\text{Alltså: } \bar{z} = \sqrt{8} \left( \cos\left(\frac{3\pi}{4}\right) + i \sin\left(\frac{3\pi}{4}\right) \right) \quad (\underline{\underline{\text{Svar}}})$$

