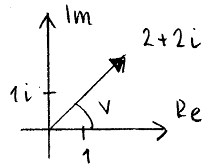
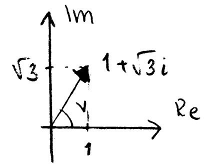
$\boxed{4250}$ Gå över till polär form:

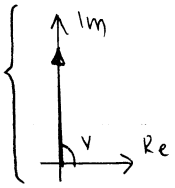
$$(2+2i) = \left\{ \begin{array}{l} r = \sqrt{2^2+2^2} = \sqrt{8} \\ v = \frac{\pi}{4} \quad \text{(ses direkt i figur)} \end{array} \right\} = \sqrt{8}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)$$



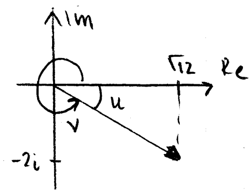
$$(1+\sqrt{3})i = \left\{ \begin{array}{l} r = \sqrt{1^2 + (\sqrt{3})^2} = \sqrt{4} = 2 \\ \tan v = \frac{\sqrt{3}}{1} \Rightarrow v = \frac{\pi}{3} \end{array} \right\} = 2\left(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3}\right)$$



$$3i = \left\{ \begin{array}{l} r = 3 \\ v = \frac{\pi}{2} \end{array} \right\} = 3\left(\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}\right)$$



$$(\sqrt{12} - 2i) = \left\{ \begin{array}{l} r = \sqrt{(\sqrt{12})^2 + 2^2} = \sqrt{16} = 4 \\ \tan u = \frac{2}{\sqrt{12}} = \frac{2}{\sqrt{4\cdot 3}} = \frac{2}{2\sqrt{3}} = \frac{1}{\sqrt{3}} \\ \Rightarrow u = \frac{\pi}{6} \\ \text{Da får vi} \\ v = 2\pi - \frac{\pi}{6} = \frac{11\pi}{6} \end{array} \right\} = 4\left(\cos\frac{11\pi}{6} + i\sin\frac{11\pi}{6}\right)$$



$\boxed{4250}$

(forts)

Talet i uppgiften kan alltså skrivas

$$\frac{\sqrt{8}\left(\cos\frac{\pi}{4}+i\sin\frac{\pi}{4}\right)\cdot 2\left(\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}\right)}{3\left(\cos\frac{\pi}{2}+i\sin\frac{\pi}{2}\right)\cdot 4\left(\cos\frac{11\pi}{6}+i\sin\frac{11\pi}{6}\right)}$$

Talets absolutbelopp är

$$\frac{\sqrt{8}\cdot \overset{1}{\cancel{2}}}{3\cdot \underset{2}{\cancel{4}}}=\frac{\sqrt{4\cdot 2}}{3\cdot 2}=\frac{\sqrt{4}\cdot\sqrt{2}}{3\cdot 2}=\frac{\cancel{2}\cdot\sqrt{2}}{3\cdot\cancel{2}}=\frac{\sqrt{2}}{3}$$

och argumentet är

$$\frac{\pi}{4}+\frac{\pi}{3}-\left(\frac{\pi}{2}+\frac{11\pi}{6}\right)=\frac{3\pi}{12}+\frac{4\pi}{12}-\frac{6\pi}{12}-\frac{22\pi}{12}=-\frac{21\pi}{12}$$

Vi adderar $2\pi=\frac{24\pi}{12}$ för att få argumentet i intervallet 0 till 2π:

$$-\frac{21\pi}{12}+\frac{24\pi}{12}=\frac{3\pi}{12}=\frac{\pi}{4}$$

Talet kan alltså till sist skrivas

$$\frac{\sqrt{2}}{3}\left(\cos\frac{\pi}{4}+i\sin\frac{\pi}{4}\right) \quad (\underline{\underline{\text{Svar}}})$$

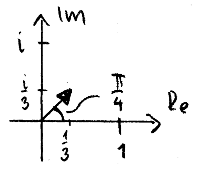
Om vi först förenklar och sedan går över till polär form blir det så här:

$$\frac{(2+2i)(1+\sqrt{3}i)}{3i(\sqrt{12}-2i)}=\frac{2(1+i)(1+\sqrt{3}i)}{3i(2\sqrt{3}-2i)}=\frac{\cancel{2}(1+i)(1+\sqrt{3}i)}{3i\cdot\cancel{2}(\sqrt{3}-i)}$$

$\sqrt{12}=\sqrt{4\cdot 3}=$
$=\sqrt{4}\cdot\sqrt{3}=2\cdot\sqrt{3}$

$\left(\frac{1}{3}\right)^2=\frac{1}{9}$

$$=\frac{(1+i)(1+\sqrt{3}i)}{3(1+\sqrt{3}i)}=\frac{1+i}{3}=\frac{1}{3}+\frac{1}{3}i=\begin{cases} r=\sqrt{\frac{1}{9}+\frac{1}{9}}=\frac{\sqrt{2}}{3}\\ v=\frac{\pi}{4}\end{cases}$$



Här gick detta mkt fortare. Dock inte så lätt att på förhand avgöra vilken väg som är snabbast.

$$=\frac{\sqrt{2}}{3}\left(\cos\frac{\pi}{4}+i\sin\frac{\pi}{4}\right) \quad (\underline{\underline{\text{Svar}}})$$
