In the end, he used technology.

$$\sqrt{12^2+16^2} = \sqrt{144+256} = \sqrt{400}$$

$2 \mid 400$
$2 \mid 200$
$2 \mid 100$
$2 \mid 50$
$5 \mid 25$
5

$2 \cdot 2 \cdot 5 = 20$

Consider the following.

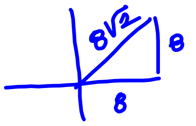
$(8 + 8i)(5 - 5i)$ $= 40(1+i)(1-i) = 40(1^2+1^2) = 80$

(a) Write the trigonometric forms of the complex numbers. (Let $0 \le \theta < 2\pi$.)

(b) Perform the indicated operation using the trigonometric forms. (Let $0 \le \theta < 2\pi$.)

(c) Perform the indicated operation using the standard forms, and check your result with that of part (b).

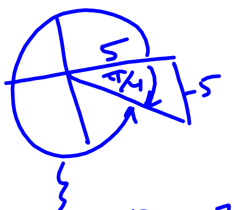
$8+8i$



$8\sqrt{2}\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right) = z_1$

$5\sqrt{2}\left(\cos\left(\frac{7\pi}{4}\right) + i\sin\left(\frac{7\pi}{4}\right)\right) = z_2$

$5-5i$



$2\pi - \frac{\pi}{4} = \frac{7\pi}{4}$

$z_1z_2 = 40\cdot 2\left(\cos 2\pi + i\sin 2\pi\right)$

$= 80(1+0i) = 80$

Consider the following.

$$\frac{6+8i}{1-\sqrt{3}i} = \frac{z_1}{z_2}$$

4.3 #19

(a) Write the trigonometric forms of the complex numbers. (Let $0 \le \theta < 2\pi$. Round your angles to three decimal places.)

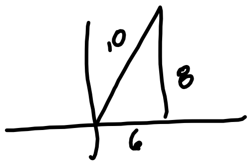
(b) Perform the indicated operation using the trigonometric forms. (Let $0 \le \theta < 2\pi$. Round your angles to three decimal places.)

(c) Perform the indicated operation using the standard forms, and check your result with that of part (b). (Round all numerical values to three decimal places.)

m: $\left(\frac{6+8i}{1-\sqrt{3}i}\right)\left(\frac{1+\sqrt{3}i}{1+\sqrt{3}i}\right) = \frac{6+6\sqrt{3}i+8i-8\sqrt{3}}{1^2+\sqrt{3}^2} = \frac{6-8\sqrt{3}+(6\sqrt{3}+8)i}{4}$

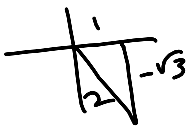
ugh!

$6+8i$:



$10(\cos(\arctan(\frac{4}{3}))$
$+ i\sin(\arctan(\frac{4}{3})))$

$1-\sqrt{3}i$



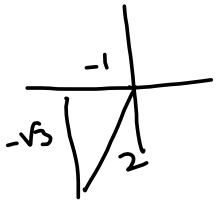
$2(\cos(\frac{5\pi}{3}) + i\sin(\frac{5\pi}{3}))$

$\rightarrow \frac{z_1}{z_2} = \frac{10}{2}(\cos(\arctan(\frac{4}{3}) - \frac{5\pi}{3})$
$+ i\sin(\arctan(\frac{4}{3}) - \frac{5\pi}{3}))$

$4(\sqrt{3}+i)^4 = 4\left(2\left(\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}\right)\right)^4$

$= 4\cdot 2^4\left(\cos\left(\frac{4\pi}{3}\right)+i\sin\left(\frac{4\pi}{3}\right)\right)$

$= 64\left(-\frac{1}{2}+i\left(-\frac{\sqrt{3}}{2}\right)\right)$

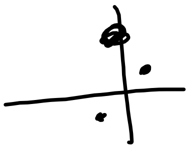


$= -32-32\sqrt{3}\,i$

$= 64\left(\cos\frac{2\pi}{3}+i\sin\frac{2\pi}{3}\right)$

$= 64\left(-\frac{1}{2}+\frac{\sqrt{3}}{2}i\right)$

$= -32+32\sqrt{3}\,i$



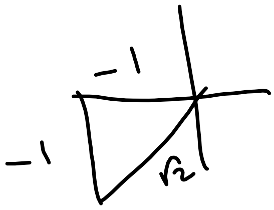
$\sqrt{7i}$?!

$7i = 7\left(\cos\frac{\pi}{2}+i\sin\frac{\pi}{2}\right)$

$\sqrt{7i} = \sqrt{7}\left(\cos\frac{\pi}{4}+i\sin\frac{\pi}{4}\right) = \sqrt{7}\left(\frac{\sqrt{2}}{2}+i\sin\frac{\sqrt{2}}{2}\right) = \frac{\sqrt{14}}{2}+\frac{\sqrt{14}}{2}i$

& the next one is: (Add $\frac{2\pi}{2}$ ← $\sqrt{*} = *^{\frac{1}{2}}$

$\frac{\pi}{4}+\pi = \frac{\pi+4\pi}{4} = \frac{5\pi}{4}$



$\sqrt{7}\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)$

$= \sqrt{7}\left(-\frac{\sqrt{2}}{2}+i\left(-\frac{\sqrt{2}}{2}\right)\right)$

$= -\frac{\sqrt{7}\sqrt{2}}{2}-\frac{\sqrt{7}\sqrt{2}}{2}i = -\frac{\sqrt{14}}{2}-\frac{\sqrt{14}}{2}i$