MTH 166, Quiz #13, Fall 2017 Name KEY

Instructions: Show all work. Use exact answers unless specifically asked to round. Answer all parts of each question.

1. Find the product of $z_1 = \cos 70° + i \sin 70°, z_2 = \cos 80° + i \sin 80°$

$\cos(150°) + i \sin 150°$

$-\frac{\sqrt{3}}{2} + i\frac{1}{2}$

2. Divide $\frac{z_1}{z_2}$ *if* $z_1 = \cos 70° + i \sin 70°, z_2 = \cos 80° + i \sin 80°$.

$\cos(-10°) + i \sin(-10°)$

$\approx +.9848 - .1736i$

3. Find the complex cube roots of $-1 + i$.

$\sqrt{2}e^{3\pi/4 i} =$

$\sqrt{2}e^{11\pi/4 i} =$

$\sqrt[6]{2}\left(\cos \pi/4 + i \sin \pi/4\right) \approx \sqrt[6]{2}\left(\frac{1}{\sqrt{2}} + i\frac{1}{\sqrt{2}}\right) \sqrt{2}e^{19\pi/4 i}$

$\sqrt[6]{2}\left(\cos 11\pi/12 + i \sin 11\pi/12\right) \approx \sqrt[6]{2}(-.966 + .259i)$

$\sqrt[6]{2}\left(\cos 19\pi/12 + i \sin 19\pi/12\right) \approx \sqrt[6]{2}(.259 - .966i)$

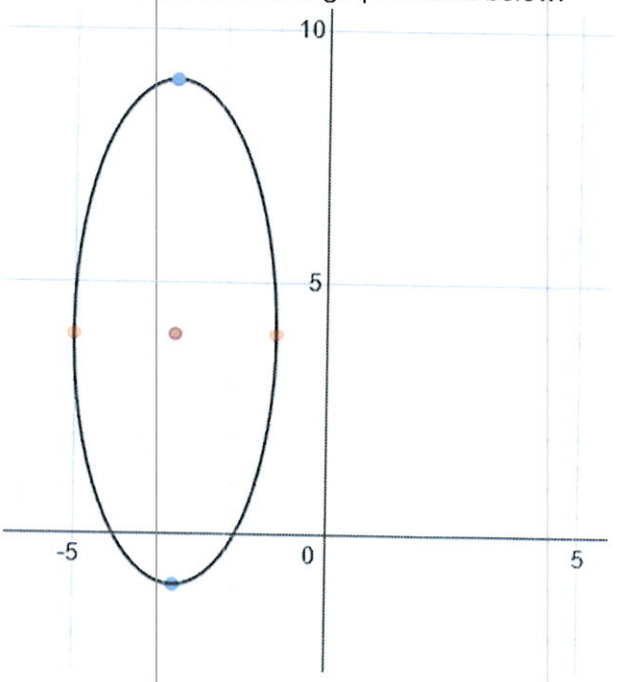
4. Find $(1 - i)^5$ using DeMoivre's Theorem.

$1 - i \quad \sqrt{2}e^{7\pi/4 i}$

$2^{5/2}\left(\cos \frac{35\pi}{4} + i \sin 35\pi/4\right)$

$\approx \sqrt{2^5}\left(-\frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}}i\right) = -\frac{4\sqrt{2}}{\sqrt{2}} + \frac{4\sqrt{2}}{\sqrt{2}}i = -4 + 4i$

5. Write the equation of the graph shown below.



$$\frac{(x+3)^2}{4} + \frac{(y-4)^2}{25} = 1$$