TRIG DeMoivre's Theorem Worksheet #2 More Roots 6.5B

Name Key Date _____ out of 22

In exercise 1, find all the complex roots. Write roots in polar form and in rectangular with the argument as an angle between 0 and 360°. (3 points)

1) Find the complex cube roots of $64(\cos 210° + i\sin 210°)$

Polar Form:

$4\text{cis}\,70°$
$4\text{cis}\,190°$
$4\text{cis}\,310°$

Rectangular Form: **Use Calculator**

$1.37+3.76i$ $\quad -3.94-.69i$ $\quad 2.57-3.06i$

In exercise 2, find all the complex roots. Write roots in polar form and in rectangular with the argument as an angle between 0 and 2π. (4 points)

2) Find the complex fourth roots of $81(\cos\frac{\pi}{3} + i\sin\frac{\pi}{3})$.

Polar Form:

$3\text{cis}\,\pi/12$
$3\text{cis}\,7\pi/12$
$3\text{cis}\,13\pi/12$
$3\text{cis}\,19\pi/12$

Rectangular Form: **Use Calculator**

$2.90+.78i$ $\quad -.78+2.90i$ $\quad -2.90-.78i$
$.78-2.90i$

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Solve each under the **set of complex numbers**. Write your answers in polar and rectangular form. Store your solutions under x and check each answer. (5 points each)

3) $x^3 = 8$

$2\text{cis}0 = 2$

$2\text{cis}\frac{2\pi}{3} = -1+\sqrt{3}i$

$2\text{cis}\frac{4\pi}{3} = -1-\sqrt{3}i$

POLAR RECT

4) $x^4 = -16$

$x^4 = 16\text{cis}\pi$

$x_1 = (16\text{cis}\pi)^{1/4}$

$x_1 = 2\text{cis}\pi/4 = \sqrt{2}+\sqrt{2}i$

$x_2 = 2\text{cis}3\pi/4 = -\sqrt{2}+\sqrt{2}i$

$x_3 = 2\text{cis}5\pi/4 = -\sqrt{2}-\sqrt{2}i$

$x_4 = 2\text{cis}\frac{7\pi}{4} = \sqrt{2}-\sqrt{2}i$

POLAR RECT