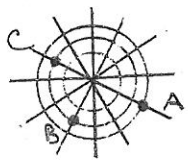
Key

Pre-Calculus **Chapter 6 Review – Day 2**

12a. Give three pairs of polar coordinates to represent point A on this graph.



$A = (3, \frac{11\pi}{6})$

$= (3, -\frac{\pi}{6})$

$= (-3, \frac{5\pi}{6})$

$= (-3, -\frac{7\pi}{6})$

b. Plot the following points on the graph.

$(-2, \frac{\pi}{3})$ label as B $\qquad$ $(2, -\frac{7\pi}{6})$ label as C

13. Convert to rectangular: $r = 3\cos\theta$

$r^2 = 3r\cos\theta$

$x^2 + y^2 = 3x$

$x^2 - 3x + \frac{9}{4} + y^2 = \frac{9}{4}$

$\boxed{(x - \frac{3}{2})^2 + y^2 = \frac{9}{4}}$

14. Convert to polar: $x + y = 4$

$r\cos\theta + r\sin\theta = 4$

$r(\cos\theta + \sin\theta) = 4$

$\boxed{r = \frac{4}{\cos\theta + \sin\theta}}$

For problems 15-18, use $z_1 = 2\sqrt{3} - 2i$ **and** $z_2 = -10i$.

15. Write both in polar form, then find $z_1 \cdot z_2$.

$z_1 = 4\,\mathrm{cis}\,\frac{11\pi}{6}$

$z_2 = 10\,\mathrm{cis}\,\frac{3\pi}{2}$

$z_1 \cdot z_2 = 40\,\mathrm{cis}\,\frac{20\pi}{6}$

$= \boxed{40\,\mathrm{cis}\,\frac{4\pi}{3}}$

16. Write both in polar form, then find $\frac{z_1}{z_2}$

$$\frac{z_1}{z_2} = \frac{4}{10}\,\text{cis}\,\frac{\pi}{3}$$

$$= \boxed{\frac{2}{5}\,\text{cis}\,\frac{\pi}{3}}$$

17. Find $z_1^{\,6}$. Write the final answer in ~~standard~~ rectangular form.

$$\left(4\,\text{cis}\,\frac{11\pi}{6}\right)^6 = 4^6\,\text{cis}\,11\pi$$

$$= 4096\,\text{cis}\,\pi$$

$$= \boxed{-4096}$$

18. Find all the cube roots of z_1.

$$\sqrt[3]{4\,\text{cis}\,\frac{11\pi}{6}} = \sqrt[3]{4}\,\text{cis}\left(\frac{\frac{11\pi}{6}+2\pi k}{3}\right)$$

$k=0 \rightarrow \sqrt[3]{4}\,\text{cis}\,\frac{11\pi}{18}$

$k=1 \rightarrow \sqrt[3]{4}\,\text{cis}\,\frac{23\pi}{18}$

$k=2 \rightarrow \sqrt[3]{4}\,\text{cis}\,\frac{35\pi}{18}$

19. Solve and graph: $x^3 - 27 = 0$

$x^3 = 27$

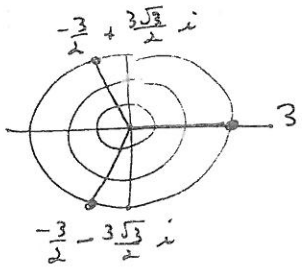
$\downarrow$

$x^3 = 27\,\text{cis}\,0 \rightarrow \sqrt[3]{27}\,\text{cis}\left(\frac{0+2\pi k}{3}\right)$

$k=0 \rightarrow 3\,\text{cis}\,0 = 3$

$k=1 \rightarrow 3\,\text{cis}\,\frac{2\pi}{3}$

$k=2 \rightarrow 3\,\text{cis}\,\frac{4\pi}{3}$



$3\cos 0 + 3\sin 0\,i$

$3 + 0i$