AP Precalc

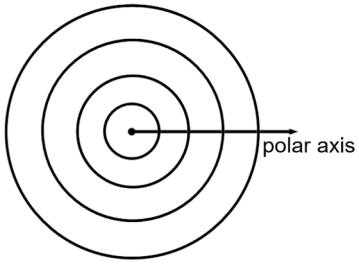
Write your questions and thoughts here!

3.13 Trigonometry and Polar Coordinates

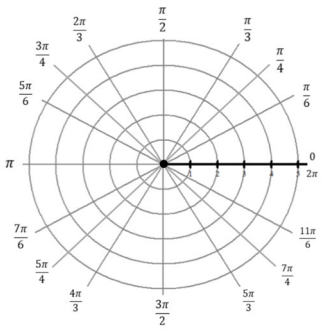
3.13 Notes

Polar Coordinates (r, θ)

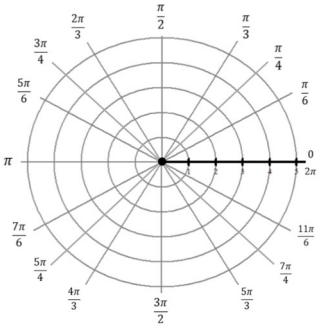
Pole:



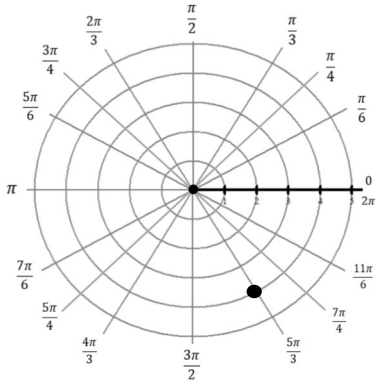
$\left(2, \frac{\pi}{6}\right)$



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



Name the point 4 different ways.



Convert polar to rectangular coordinates.

Formula:

$x =$

$y =$

$\left(6, \frac{\pi}{3}\right)$

$\left(4, \frac{5\pi}{4}\right)$

Convert rectangular to polar coordinates where $0 \leq \theta \leq 2\pi$.

Formula:

$r =$

$\theta =$

$(-3, 5)$

$(2, -6)$

© The Algebros from FlippedMath.com

Write your questions and thoughts here!

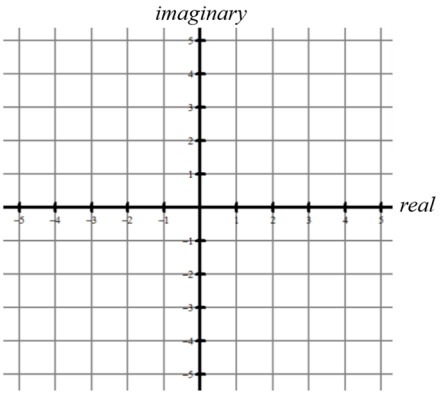
Complex Numbers $a + bi$

Absolute Value of Complex Number

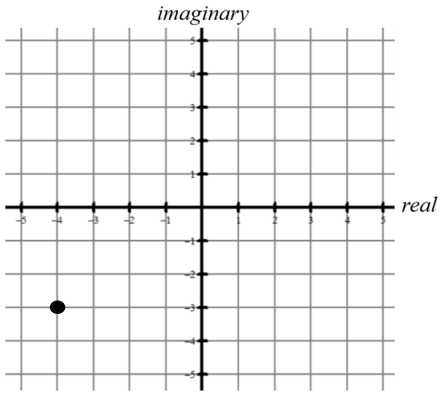
$z = a + bi$

$|z| = \sqrt{a^2 + b^2}$

$z = 3 + 4i$



Name the point.



Convert Rectangular Complex Numbers to Polar Form.

Formula:

$r =$

$\theta =$

$-3 + i\sqrt{7}$

$2 - i$

Convert Polar Complex Numbers to Rectangular Form.

Formula:

$x =$

$y =$

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

$4\left[\cos\left(\frac{3\pi}{2}\right) + i\sin\left(\frac{3\pi}{2}\right)\right]$

© The Algebros from FlippedMath.com

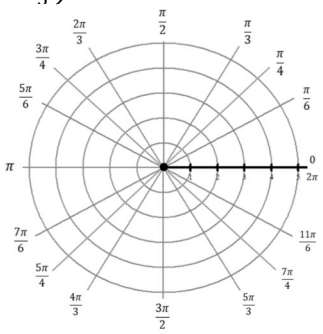
3.13 Trigonometry and Polar Coordinates

AP Precalculus

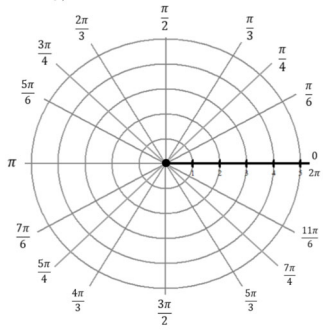
3.13 Practice

Plot the following polar points.

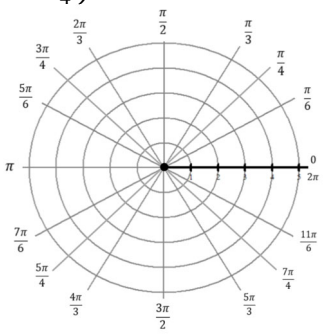
1. $\left(3, \frac{2\pi}{3}\right)$



2. $\left(-2, \frac{\pi}{6}\right)$

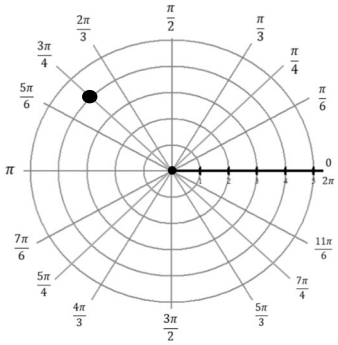


3. $\left(4, -\frac{3\pi}{4}\right)$

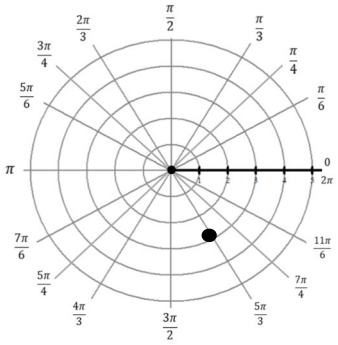


Name the polar point four different ways.

4.



5.



Convert the polar coordinates to rectangular coordinates.

5. $\left(4, \frac{2\pi}{3}\right)$

6. $\left(-2, \frac{\pi}{4}\right)$

7. $\left(5, \frac{5\pi}{6}\right)$

Convert the rectangular coordinates to polar coordinates where $0 \leq \theta \leq 2\pi$.

8. $(2, 4)$

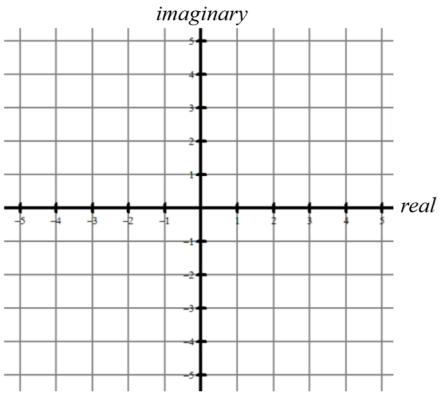
9. $(-3, 4)$

10. $(2, -1)$

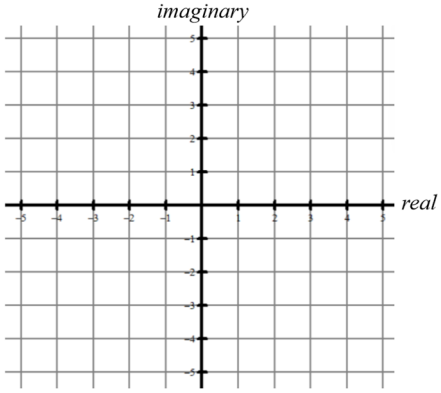
© The Algebros from FlippedMath.com

Plot the following points on the complex plane.

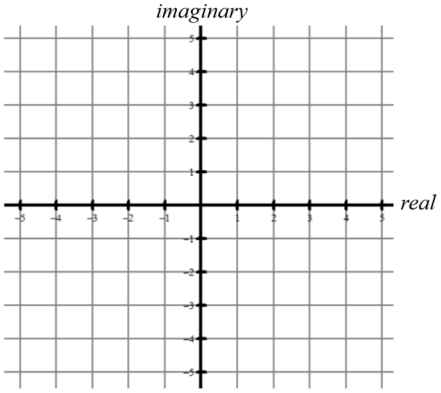
11. $3 - 4i$



12. $-4 + i$



13. $1 + 2i$



Convert rectangular complex numbers to polar form.

14. $3 + 4i$

15. $2 - 5i$

16. $-3 - 3i$

Convert polar complex numbers to rectangular form.

17. $10\left[\cos\left(\frac{3\pi}{4}\right) + i\sin\left(\frac{3\pi}{4}\right)\right]$

18. $4\left[\cos\left(\frac{3\pi}{2}\right) + i\sin\left(\frac{3\pi}{2}\right)\right]$

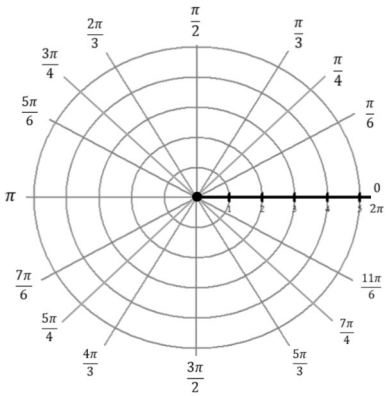
19. $3\cos\left(\frac{5\pi}{3}\right) + 3i\sin\left(\frac{5\pi}{3}\right)$

Fill in the table with approximate decimal values using a calculator. Plot the points.

20. $r = 4\cos\theta$

$\boldsymbol{\theta}$	0	$\frac{\pi}{6}$	$\frac{\pi}{4}$	$\frac{\pi}{3}$	$\frac{\pi}{2}$
$\boldsymbol{r}$					

$\boldsymbol{\theta}$	$\frac{2\pi}{3}$	$\frac{3\pi}{4}$	$\frac{5\pi}{6}$	π
$\boldsymbol{r}$				



© The Algebros from FlippedMath.com

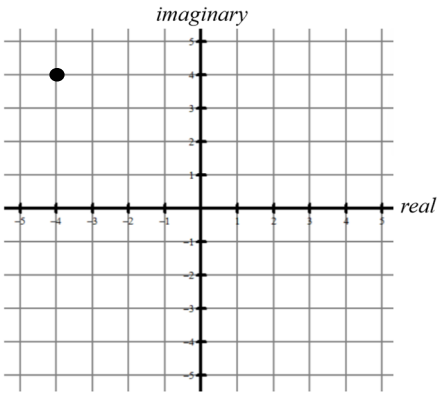
21. A complex number has the rectangular coordinates $(1, -\sqrt{3})$ Which of the following is one way to Express the complex number using its polar coordinates (r, θ) ?

(A) $\left(2\cos\left(-\frac{\pi}{6}\right)\right) + i\left(2\sin\left(-\frac{\pi}{6}\right)\right)$

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

(C) $\left(2\cos\left(\frac{\pi}{6}\right)\right) + i\left(2\sin\left(\frac{\pi}{6}\right)\right)$

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



22. The graph above indicates a point in the complex plane. The complex number has polar coordinates (r, θ). Which of the following completes the expression for the point in polar form $(4\sqrt{2}\cos\theta) - i(4\sqrt{2}\sin\theta)$?

(A) $\theta = \frac{\pi}{4}$

(B) $\theta = \frac{3\pi}{4}$

(C) $\theta = \frac{5\pi}{4}$

(D) $\theta = \frac{7\pi}{4}$

23. The point A has polar coordinates $\left(4, \frac{7\pi}{6}\right)$. Which of the following also gives the location of point A in polar coordinates?

(A) $\left(4, -\frac{11\pi}{6}\right)$

(B) $\left(4, -\frac{5\pi}{6}\right)$

(C) $\left(-4, -\frac{\pi}{6}\right)$

(D) $\left(-4, -\frac{5\pi}{6}\right)$

© The Algebros from FlippedMath.com