Kuta Software - Infinite Precalculus

Name_____

Complex Numbers and Polar Form

Date_____ Period____

Find the absolute value.

1) $4 + 3i$

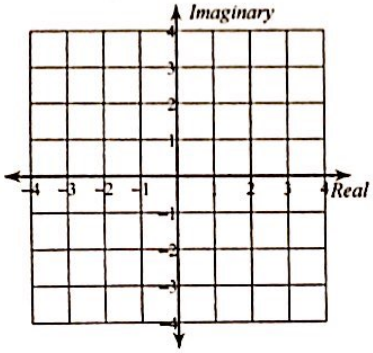
2) $-\sqrt{15} + i\sqrt{15}$

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

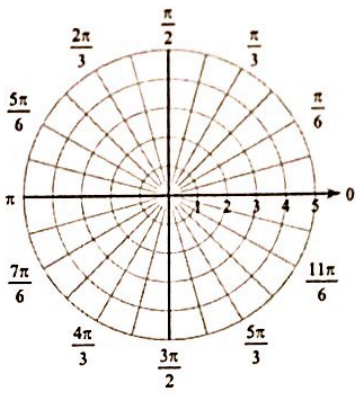
4) $\sqrt{21}\left(\cos\frac{\pi}{2} + i\sin\frac{\pi}{2}\right)$

Plot each point in the complex plane. Use rectangular coordinates when the number is given in rectangular form and polar coordinates when polar form is used.

5) $1 + 3i$



6) $3\left(\cos\frac{7\pi}{6} + i\sin\frac{7\pi}{6}\right)$



Convert numbers in rectangular form to polar form and polar form to rectangular form.

7) $-2\sqrt{3} - 2i$

8) $\sqrt{21} + i\sqrt{7}$

9) $-\frac{5\sqrt{2}}{2} - \frac{5\sqrt{2}}{2}i$

10) $2i$

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

12) $2\left(\cos\frac{4\pi}{3} + i\sin\frac{4\pi}{3}\right)$

13) $\sqrt{3}\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

14) $\sqrt{30}(\cos\pi+i\sin\pi)$

Simplify. Write your answer in rectangular form when rectangular form is given and in polar form when polar form is given.

15) $(4+4i)(5-3i)$

16) $4\sqrt{2}\left(\cos\frac{7\pi}{4}+i\sin\frac{7\pi}{4}\right)\cdot 2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$

17) $\frac{6-2i}{2+4i}$

18) $\frac{2\sqrt{6}\left(\cos\frac{7\pi}{6}+i\sin\frac{7\pi}{6}\right)}{6\left(\cos\frac{11\pi}{6}+i\sin\frac{11\pi}{6}\right)}$

19) $(-1-6i)^3$

20) $\left(2\left(\cos\frac{7\pi}{6}+i\sin\frac{7\pi}{6}\right)\right)^3$

Find all *n*th roots. Write your answers in rectangular form when rectangular form is given and in polar form when polar form is given.

21) $2i,\ n=3$

22) $6\left(\cos\frac{3\pi}{4}+i\sin\frac{3\pi}{4}\right),\ n=4$

Critical thinking questions:

23) Show that $-i\sqrt[23]{n}$ is a 23rd root of ni.

24) Solve for x : $(2+i)x=1+2i$
Hint: x is a complex number.