

Complex numbers rectangular and trig form

Date _____ Period _____

Find the absolute value.

1) $6\left(\cos \frac{\pi}{4} + i\sin \frac{\pi}{4}\right)$

2) $2\sqrt{5}\left(\cos \frac{2\pi}{3} + i\sin \frac{2\pi}{3}\right)$

3) $\frac{5\sqrt{3}}{2} - \frac{5}{2}i$

4) $-5 + i$

Write each in polar form.

5) $\frac{\sqrt{21}}{2} - \frac{\sqrt{7}}{2}i$

6) $-3\sqrt{3} - 3i$

7) 5

8) $-\frac{\sqrt{42}}{2} - \frac{\sqrt{14}}{2}i$

Write each in rectangular form.

9) $5\left(\cos \frac{2\pi}{3} + i\sin \frac{2\pi}{3}\right)$

10) $2\sqrt{3}\left(\cos \frac{11\pi}{6} + i\sin \frac{11\pi}{6}\right)$

11) $4\left(\cos \frac{5\pi}{6} + i\sin \frac{5\pi}{6}\right)$

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

Simplify. Write your answer in rectangular form.

13) $(2 - i)(5 - 4i)$

14) $(6 + 6i)(-4 - 4i)$

Simplify. Write your answer in polar form.

15) $4(\cos 90 + i\sin 90) \cdot 2(\cos 30 + i\sin 30)$

16) $2\sqrt{5}(\cos 270 + i\sin 270) \cdot 5(\cos 45 + i\sin 45)$

17) $\frac{4(\cos 270 + i\sin 270)}{2(\cos 270 + i\sin 270)}$

18) $\frac{4(\cos 45 + i\sin 45)}{2\sqrt{2}(\cos 30 + i\sin 30)}$

$$19) \left(3 \left(\cos \frac{5\pi}{3} + i \sin \frac{5\pi}{3} \right) \right)^2$$

$$20) \left(4 \left(\cos \frac{5\pi}{4} + i \sin \frac{5\pi}{4} \right) \right)^3$$

Find all n th roots. Write your answers in polar form.

$$21) 32(\cos 300 + i \sin 300), n = 5$$

$$22) 64(\cos 150 + i \sin 150), n = 3$$

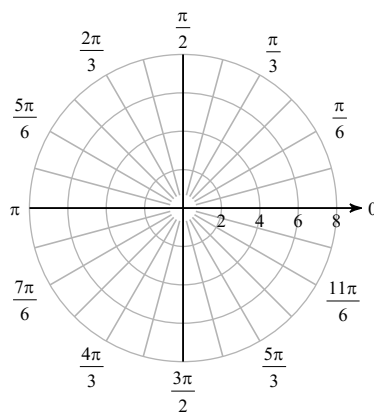
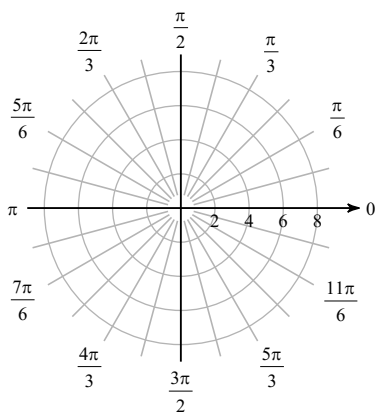
$$23) 36(\cos 240 + i \sin 240), n = 2$$

$$24) 16 \left(\cos \frac{4\pi}{3} + i \sin \frac{4\pi}{3} \right), n = 4$$

Plot each point in the complex plane using polar coordinates.

$$25) 6 \left(\cos \frac{11\pi}{6} + i \sin \frac{11\pi}{6} \right)$$

$$26) 5 \left(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6} \right)$$



Answers to Complex numbers rectangular and trig form

1) 6 2) $2\sqrt{5}$ 3) 5 4) $\sqrt{26}$
 5) $\sqrt{7}\left(\cos \frac{11\pi}{6} + i\sin \frac{11\pi}{6}\right)$ 6) $6(\cos 210 + i\sin 210)$ 7) $5(\cos 0 + i\sin 0)$

8) $\sqrt{14}(\cos 210 + i\sin 210)$ 9) $-\frac{5}{2} + \frac{5\sqrt{3}}{2}i$ 10) $3 - i\sqrt{3}$

11) $-2\sqrt{3} + 2i$ 12) $-\frac{3}{2} + \frac{3\sqrt{3}}{2}i$ 13) $6 - 13i$ 14) $-48i$

15) $8(\cos 120 + i\sin 120)$ 16) $10\sqrt{5}(\cos 315 + i\sin 315)$ 17) $2(\cos 0 + i\sin 0)$

18) $\sqrt{2}(\cos 15 + i\sin 15)$ 19) $9\left(\cos \frac{4\pi}{3} + i\sin \frac{4\pi}{3}\right)$ 20) $64\left(\cos \frac{7\pi}{4} + i\sin \frac{7\pi}{4}\right)$

21) $2(\cos 60 + i\sin 60)$ 22) $4(\cos 50 + i\sin 50)$ 23) $6(\cos 120 + i\sin 120)$
 $2(\cos 132 + i\sin 132)$ $4(\cos 170 + i\sin 170)$ $6(\cos 300 + i\sin 300)$
 $2(\cos 204 + i\sin 204)$
 $2(\cos 276 + i\sin 276)$
 $2(\cos 348 + i\sin 348)$

24) $2\left(\cos \frac{\pi}{3} + i\sin \frac{\pi}{3}\right)$
 $2\left(\cos \frac{5\pi}{6} + i\sin \frac{5\pi}{6}\right)$
 $2\left(\cos \frac{4\pi}{3} + i\sin \frac{4\pi}{3}\right)$
 $2\left(\cos \frac{11\pi}{6} + i\sin \frac{11\pi}{6}\right)$

