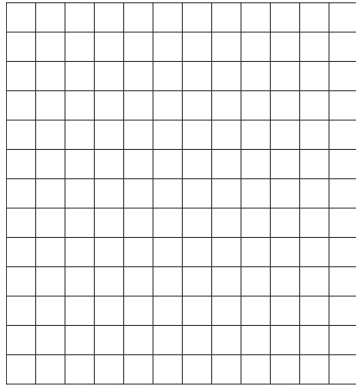




8-5 Additional Practice

Polar Form of Complex Number

1. Graph the complex number $7 \operatorname{cis}\left(\frac{\pi}{6}\right)$.



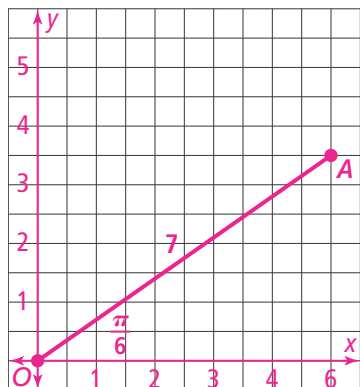
2. Express $\sqrt{3} \operatorname{cis}\left(\frac{5\pi}{6}\right)$ in rectangular form.
3. Express $-\frac{1}{2} + \frac{\sqrt{3}}{2}i$ in polar form.
4. Find the product of $z_1 = \sqrt{5} \operatorname{cis} 120^\circ$ and $z_2 = 7 \operatorname{cis} 80^\circ$ in polar form.
5. What is the product of $z_1 = 3 + 4i$ and $z_2 = \sqrt{3} - i$?
6. Use polar form to find z^5 , if $z = -2 + 2i$.
7. What is z^5 in rectangular form, if $z = -2 + 2i$?
8. A student made some mistakes when he was writing $z = 1 + \sqrt{3}i$ in polar form. Correct the mistake next to the row, where the mistake occurred.
- $$r = \sqrt{x^2 + y^2} = \sqrt{1^2 + (\sqrt{3})^2} = 2$$
- $$\tan \theta = \sqrt{3}, \theta = \frac{\pi}{6} \text{ for } 0 \leq \theta \leq 2\pi$$
- Therefore, $1 + \sqrt{3}i = 2 \operatorname{cis} \frac{\pi}{6}$
9. The current in an electric circuit is defined by $\sqrt{2} \operatorname{cis} \frac{\pi}{4}$ and the impedance is $2 \operatorname{cis} \frac{11\pi}{6}$ ohm. Determine the voltage in the circuit. *Hint:* Use $E = I \cdot Z$, where E is voltage, I is electric current, and Z is impedance.
10. Explain why the coordinates $\left(-3, \frac{19\pi}{20}\right)$ and $\left(-3, \frac{\pi}{20}\right)$ represent the same point in the coordinate plane.



8-5 Additional Practice

Polar Form of Complex Number

1. Graph the complex number $7 \operatorname{cis}(\frac{\pi}{6})$.



2. Express $\sqrt{3} \operatorname{cis}(\frac{5\pi}{6})$ in rectangular form. $-\frac{3}{2} + \frac{\sqrt{3}}{2}i$
3. Express $-\frac{1}{2} + \frac{\sqrt{3}}{2}i$ in polar form. $\operatorname{cis} \frac{2\pi}{3}$
4. Find the product of $z_1 = \sqrt{5} \operatorname{cis} 120^\circ$ and $z_2 = 7 \operatorname{cis} 80^\circ$ in polar form.
 $-7\sqrt{5} \operatorname{cis} 200$
5. What is the product of $z_1 = 3 + 4i$ and $z_2 = \sqrt{3} - i$? $10 \operatorname{cis} 23$
6. Use polar form to find z^5 , if $z = -2 + 2i$. $128\sqrt{2} \operatorname{cis} \frac{7\pi}{4}$
7. What is z^5 in rectangular form, if $z = -2 + 2i$? $128 - 128i$
8. A student made some mistakes when he was writing $z = 1 + \sqrt{3}i$ in polar form. Correct the mistake next to the row, where the mistake occurred.
- $$r = \sqrt{x^2 + y^2} = \sqrt{1^2 + (\sqrt{3})^2} = 2$$
- $$\tan \theta = \sqrt{3}, \theta = \frac{\pi}{6} \text{ for } 0 \leq \theta \leq 2\pi \quad \theta = \frac{\pi}{3}$$
- Therefore, $1 + \sqrt{3}i = 2 \operatorname{cis} \frac{\pi}{6}$ $2 \operatorname{cis} \frac{\pi}{3}$
9. The current in an electric circuit is defined by $\sqrt{2} \operatorname{cis} \frac{\pi}{4}$ and the impedance is $2 \operatorname{cis} \frac{11\pi}{6}$ ohm. Determine the voltage in the circuit. *Hint: Use $E = I \cdot Z$, where E is voltage, I is electric current, and Z is impedance.* $2\sqrt{2} \operatorname{cis} \frac{25\pi}{12}$
10. Explain why the coordinates $(-3, \frac{19\pi}{20})$ and $(-3, \frac{\pi}{20})$ represent the same point in the coordinate plane.

The endpoints of the terminal side of both angles coincide.