

Name _____ Date _____ Per _____

Use De Moivre's theorem to simplify each expression. Leave the answer in trigonometric form, with an argument in $[0^\circ, 360^\circ)$ or $[0, 2\pi)$.

1. $[2(\cos 45^\circ + i \sin 45^\circ)]^5$

2. $[\cos(\pi/12) + i \sin(\pi/12)]^8$

3. $[3\sqrt{2}(\cos(5\pi/6) + i \sin(5\pi/6))]^3$

Simplify each expression by using trigonometric form and De Moivre's theorem. Write the answer in the form $a + bi$.

4. $(-1 + i\sqrt{3})^4$

Simplify each expression by using trigonometric form and De Moivre's theorem. Write the answer in the form $a + bi$.

5. $(-3\sqrt{2} - 3i\sqrt{2})^4$

6. $(-4 + i)^5$

Find the indicated roots. Leave the answers in trigonometric form.

7. The fifth roots of $32(\cos 135^\circ + i \sin 135^\circ)$

Find the indicated roots. Leave the answers in trigonometric form.

8. The sixth roots of $\cos(4\pi/3) + i \sin(4\pi/3)$

Find the indicated roots in the form $a + bi$. Check by graphing the roots in the complex plane.

9. The sixth roots of 64

10. The cube roots of $27i$

Find the indicated roots in the form $a + bi$. Check by graphing the roots in the complex plane.

11. The fourth roots of $-8 - 8i\sqrt{3}$

Find all complex solutions to each equation. Express answers in the form $a + bi$.

12. $x^3 - 64 = 0$

13. $x^3 + 512 = 0$