Practice for trigonometric form of complex numbers

Represent the complex number graphically and find the trigonometric form of the number

1. $3 - 3i$ **2.** $\sqrt{3} + i$ **3.** $-5i$ **4.** 4

Find the standard form of the number

1. $\frac{1}{4}(\cos 300° + i \sin 300°)$

Perform the operation and leave in trigonometric form

1. $\left[2\left(\cos\frac{\pi}{4} + i\sin\frac{\pi}{4}\right)\right]\left[6\left(\cos\frac{\pi}{12} + i\sin\frac{\pi}{12}\right)\right]$

2. $\frac{5\,(\cos 4.3 + i \sin 4.3)}{4\,(\cos 2.1 + i \sin 2.1)}$

3. $\frac{12\,(\cos 52° + i \sin 52°)}{3\,(\cos 110° + i \sin 110°)}$

Use DeMoivre's Theorem to find the indicated power of the complex number. Write in standard form.

1. $(1 + i)^5$ **2.** $\left(\sqrt{3} + i\right)^7$

Find the indicated roots of the complex number.

Must show all steps on test.

1. Fourth roots of 16 **2. Cube rooms of** $\sqrt{32} - \sqrt{32}\,i$

Answers

Represent the complex number graphically and find the trigonometric form of the number

1. $3-3i$ $3\sqrt{2}\left(\cos\frac{7\pi}{4}+i\sin\frac{7\pi}{4}\right)$ **2.** $\sqrt{3}+i$ $2\left(\cos\frac{\pi}{6}+i\sin\frac{\pi}{6}\right)$ **3.** $-5i$ $5\left(\cos\frac{3\pi}{2}+i\sin\frac{3\pi}{2}\right)$ **4.** 4 $4(\cos 0+i\sin 0)$

Find the standard form of the number

1. $\frac{1}{4}(\cos 300^\circ + i\sin 300^\circ)$

$\frac{1}{8}-\frac{\sqrt{3}}{8}i$

Perform the operation and leave in trigonometric form

1. $\left[2\left(\cos\frac{\pi}{4}+i\sin\frac{\pi}{4}\right)\right]\left[6\left(\cos\frac{\pi}{12}+i\sin\frac{\pi}{12}\right)\right]$ $12\left(\cos\frac{\pi}{3}+i\sin\frac{\pi}{3}\right)$

2. $\frac{5(\cos 4.3+i\sin 4.3)}{4(\cos 2.1+i\sin 2.1)}$ $\frac{5}{4}(\cos 2.2+i\sin 2.2)$

3. $\frac{12(\cos 52^\circ+i\sin 52^\circ)}{3(\cos 110^\circ+i\sin 110^\circ)}$ $4(\cos(-58^\circ)+i\sin(-58^\circ))=$ $4(\cos 58^\circ - i\sin 58^\circ)$

Use DeMoivre's Theorem to find the indicated power of the complex number. Write in standard form.

1. $(1+i)^5$ $-4-4i$ **2.** $(\sqrt{3}+i)^7$ $-64\sqrt{3}-64i$

Find the indicated roots of the complex number. Must show all steps on test.

1. Fourth roots of 16

2. ~~Sixth roots of 64i~~ Cube Roots of $\sqrt{32}-\sqrt{32}i$

$2\left(\cos\frac{7\pi}{12}+i\sin\frac{7\pi}{12}\right)=$ $-.518+1.932i$

$2\left(\cos\frac{5\pi}{4}+i\sin\frac{5\pi}{4}\right)=-\sqrt{2}-\sqrt{2}i$

$2\left(\cos\frac{23\pi}{12}+i\sin\frac{23\pi}{12}\right)=1.932-.518i$

1. 2, -2, 2i, and -2i

REVIEW: Vectors and Trigonometric Form of Complex Number

Find the component form of **v** given its magnitude and the angle it makes with the positive x-axis. Sketch **v**.

1. $\|v\| = 2\sqrt{3}\,, \theta = 90°$

$\langle 0, 2\sqrt{3} \rangle$

2. $\|v\| = 8\,, \theta = 225°$

$\langle -4\sqrt{2}, -4\sqrt{2} \rangle$

Find the magnitude and direction angle of the vector **v**.

3. $\mathbf{v} = -4i + 7j$

$\|v\| = \sqrt{65}$

$\theta = 119.745°$

4. $\mathbf{v} = -3i - 3j$

$\|v\| = 3\sqrt{2}$

$\theta = 225°$

5. $\mathbf{v} = 8i - j$

$\|v\| = \sqrt{65}$

$\theta = 352.875°$

Find the dot product of **u** and **v**.

6. $u = \langle 4, -3 \rangle\,, v = \langle 1, 5 \rangle$

-11

7. $\boldsymbol{u} = -3\boldsymbol{i} + \boldsymbol{j},\ \boldsymbol{v} = -2\boldsymbol{i} - 6\boldsymbol{j}$

0

Find the angle θ between the vectors. Round to the nearest tenth of a degree.

8. $u = \langle 1, -4 \rangle\,, v = \langle 2, 2 \rangle$

$\theta = 120.9°$

9. $\boldsymbol{u} = 3\boldsymbol{i} + 7\boldsymbol{j},\ \boldsymbol{v} = -\boldsymbol{i} + 2\boldsymbol{j}$

$\theta = 49.8°$

Represent the complex number graphically, and find the trigonometric form of the number.

13. $2 - 2i$

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

14. $-3i$

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

15. 6

$6(\cos 0 + i\sin 0)$

Perform the operation and leave the result in trigonometric form.

16. Find $z_1 z_2$ $\quad z_1 = 3\left(\cos\frac{\pi}{6} + \sin\frac{\pi}{6}i\right)$ $\quad z_2 = 4\left(\cos\frac{\pi}{12} + \sin\frac{\pi}{12}i\right)$

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

Std Form.

$6\sqrt{2} + 6\sqrt{2}\,i$

17. Find $\frac{z_1}{z_2}$ $\quad z_1 = (\cos 2.5 + \sin 2.5\,i)$ $\quad z_2 = 6(\cos 1.5 + i\sin 1.5)$

$\frac{1}{6}(\cos 1 + i\sin 1)$

Std Form

$.090 + .140\,i$

Use DeMoivre's Theorem to find the indicated power of the complex number. Write the result in standard form.

18. $(1 - i)^6$

$8i$

19. $[2(\cos 15° + i\sin 15°)]^4$

$8 + 8\sqrt{3}\,i$

20. Find the sixth roots of $64i$

$2\left(\cos\frac{\pi}{12} + i\sin\frac{\pi}{12}\right) = 1.932 + .518\,i$

$2\left(\cos\frac{5\pi}{12} + i\sin\frac{5\pi}{12}\right) = .518 + 1.932\,i$

$2\left(\cos 3\pi/4 + i\sin 3\pi/4\right) = -\sqrt{2} + \sqrt{2}\,i$

$2\left(\cos\frac{13\pi}{12} + i\sin\frac{13\pi}{12}\right) = -1.932 - .518\,i$

$2\left(\cos\frac{17\pi}{12} + i\sin\frac{17\pi}{12}\right) =$

$-.518 - 1.932\,i$

$2\left(\cos\frac{7\pi}{4} + i\sin\frac{7\pi}{4}\right) =$

$\sqrt{2} - \sqrt{2}\,i$