

Precalculus · Complex Numbers in Polar Form · Quiz

Common Core N-CN.B.4, N-CN.B.5, N-CN.B.6, N-CN.A.3 · mathovore.fr

Name: _____ Date: ____/____/____ Score: _____

This precalculus complex polar quiz asks 10 multiple-choice questions on complex numbers in polar form, and each answer comes with a short explanation.

Ten multiple-choice questions on complex numbers in polar form: modulus and argument, conjugates, polar conversion, products, De Moivre's theorem, distance and midpoint. Choose the one best answer, then read the explanation to learn which mistake each wrong option comes from.

PrecalculusCommon Core: N-CN.B.4 · N-CN.B.5 · N-CN.B.6 · N-CN.A.3

Questions

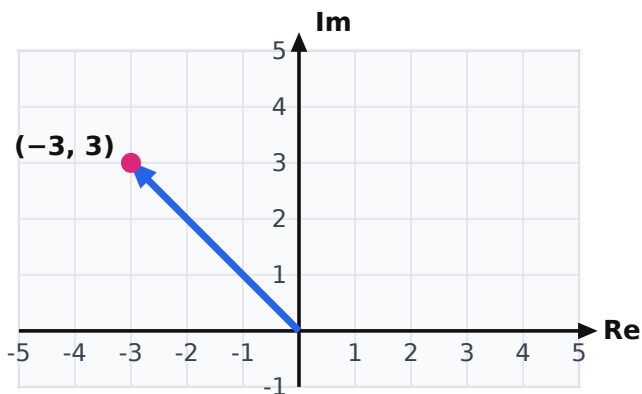
Question 1

Find $|-6+8i|$.

- A. 14
- B. 2
- C. 10
- D. 100

Question 2

What is the argument of the complex number shown?



A point in the complex plane.

- A. 45°
- B. 135°
- C. 225°
- D. 315°

Question 3

What is the conjugate of $4-7i$?

- A. $4+7i$
- B. $-4+7i$
- C. $-4-7i$
- D. $7-4i$

Question 4

Evaluate $(3+2i)(3-2i)$.

- A. 5
- B. 9
- C. 13
- D. -13

Question 5

Which is the polar form of $-1+i$?

- A. $\sqrt{2}(\cos 45^\circ + i\sin 45^\circ)$
- B. $2(\cos 135^\circ + i\sin 135^\circ)$
- C. $\sqrt{2}(\cos 225^\circ + i\sin 225^\circ)$
- D. $\sqrt{2}(\cos 135^\circ + i\sin 135^\circ)$

Question 6

Find $2(\cos 30^\circ + i\sin 30^\circ) \cdot 5(\cos 60^\circ + i\sin 60^\circ)$.

- A. $7(\cos 90^\circ + i\sin 90^\circ)$
- B. $10(\cos 30^\circ + i\sin 30^\circ)$
- C. $10(\cos 90^\circ + i\sin 90^\circ)$
- D. $10(\cos 180^\circ + i\sin 180^\circ)$

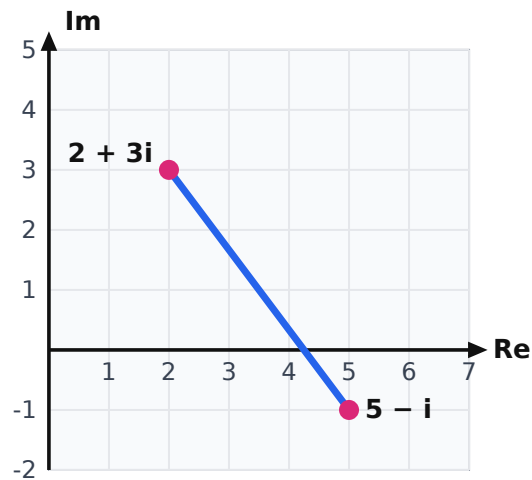
Question 7

Use De Moivre's theorem to evaluate $(1-i)^6$.

- A. $8i$
- B. $-8i$
- C. 8
- D. -8

Question 8

What is the distance between the two complex numbers shown?



Two complex numbers.

- A. 7
- B. 25
- C. 1
- D. 5

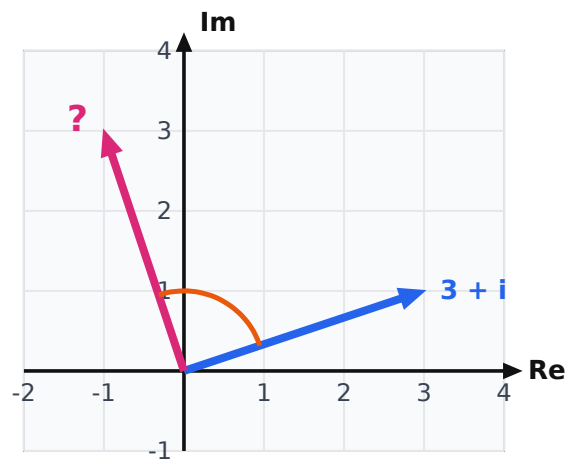
Question 9

Find the midpoint of $-4+i$ and $6+5i$.

- A. $2+6i$
- B. $5+2i$
- C. $-5-2i$
- D. $1+3i$

Question 10

The figure shows $3+i$. Which number is $i(3+i)$, the point rotated 90° counterclockwise?



The point $3 + i$ and a rotated point.

- A. $1 - 3i$
- B. $-1 + 3i$
- C. $-1 - 3i$
- D. $1 + 3i$

Answer key

1. **C** - $\sqrt{36+64}=10$. Adding the absolute values gives 14; forgetting the square root gives 100.
2. **B** - The point is in quadrant II with reference angle 45° , so $\theta = 180^\circ - 45^\circ = 135^\circ$.
3. **A** - The conjugate changes only the sign of the imaginary part. Changing both signs gives the negative, not the conjugate.
4. **C** - $9-4i^2=9+4=13$. Using $i^2=1$ gives the common wrong answer 5.
5. **D** - $r=\sqrt{1+1}=\sqrt{2}$ and the point is in quadrant II, so $\theta=135^\circ$. Using 45° ignores the quadrant.
6. **C** - Multiply the moduli ($2 \times 5 = 10$) and add the angles ($30^\circ + 60^\circ = 90^\circ$). Adding the moduli or multiplying the angles are the typical errors.
7. **A** - $(\sqrt{2})^6(\cos(-270^\circ) + i\sin(-270^\circ)) = 8(0+i) = 8i$.
8. **D** - $|(2+3i)-(5-i)| = |-3+4i| = \sqrt{9+16} = 5$. Forgetting the square root gives 25.
9. **D** - $\frac{(-4+6i)+(1+5i)}{2} = 1+3i$. Skipping the division by 2 gives $2+6i$.
10. **B** - $i(3+i) = 3i+i^2 = -1+3i$. Multiplying by $-i$ would rotate clockwise and give $1-3i$.

How does this quiz work?

Read each question, choose one answer among A, B, C and D, then check it: a short explanation appears after every answer. Your score out of 10 is shown at the end, and you can restart the quiz as often as you like.

What should you review before the quiz?

Reread the key facts of the lesson and the worked example. If a question is hard, go back to the matching part of the lesson, then try the quiz again. Write your work on scrap paper: most mistakes come from skipping a step, not from the idea itself.

Remember:

- Modulus $|a + bi| = \sqrt{a^2 + b^2}$; the conjugate $a - bi$ satisfies $z \cdot \bar{z} = |z|^2$.
- Polar form: $z = r(\cos \theta + i \sin \theta)$, with $a = r \cos \theta$ and $b = r \sin \theta$.
- Product: multiply moduli, add arguments. Quotient: divide moduli, subtract arguments.
- De Moivre: $[r(\cos \theta + i \sin \theta)]^n = r^n(\cos n\theta + i \sin n\theta)$.
- Distance between z_1 and z_2 is $|z_1 - z_2|$; the midpoint is $(z_1 + z_2)/2$.

How to use this precalculus complex polar quiz

Retake this precalculus complex polar quiz until every answer is right, then move on to the

worksheet and the test.

