

Precalculus - Complex Numbers and Complex Zeros - Quiz

Common Core N-CN.A.1, N-CN.A.2, N-CN.A.3, N-CN.C.7, N-CN.C.8, N-CN.C.9 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

Pick the best answer for 10 questions on complex numbers. Explanations show the usual mistakes, such as forgetting that i squared is -1 .

Precalculus · Common Core State Standards: **N-CN.A.1, N-CN.A.2, N-CN.A.3, N-CN.C.7, N-CN.C.8, N-CN.C.9**

Questions

Question 1

What is i^2 ?

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

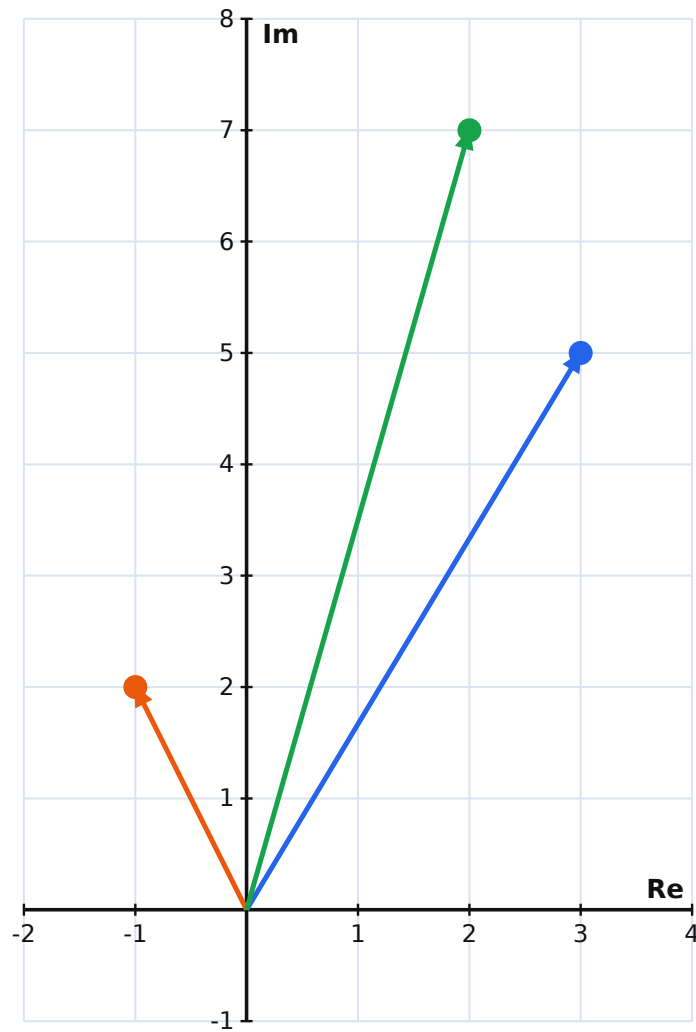
Question 2

Simplify i^{15} .

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

Question 3

The figure shows the sum of two complex numbers. What is $(3+5i)+(-1+2i)$?



Vector sum.

- A. $2+3i$
- B. $2+7i$
- C. $4+7i$
- D. $2+10i$

Question 4

Multiply: $(1+2i)(3-i)$.

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

Question 5

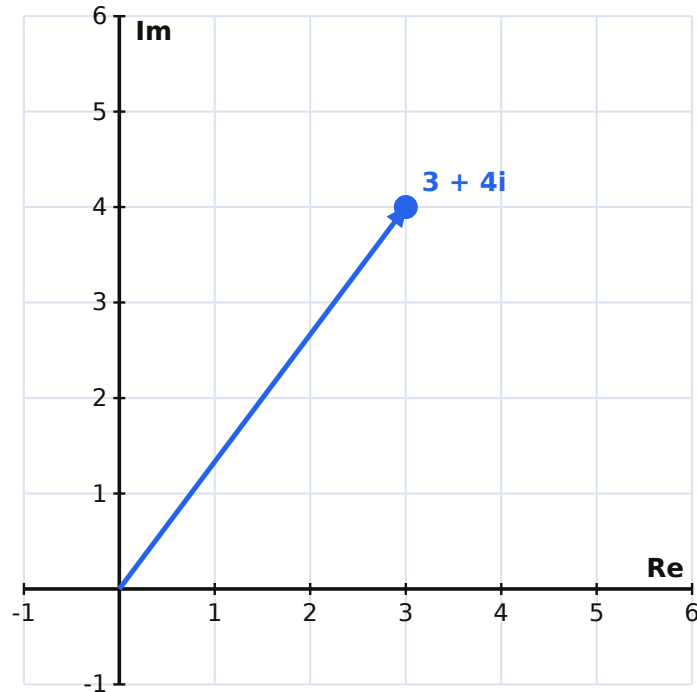
Which is the conjugate of $4-7i$?

- A. $-4+7i$

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

Question 6

What is $|3+4i|$?

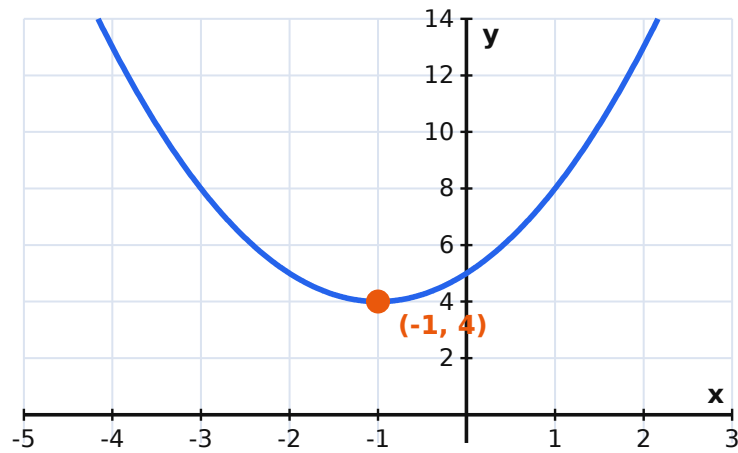


The point $3 + 4i$.

- A. 7
- B. 25
- C. 5
- D. $\sqrt{7}$

Question 7

The graph of a parabola never meets the x -axis. What kind of roots does the equation have?



Parabola above the x-axis.

- A. Two real roots
- B. One real root
- C. Two non-real complex roots
- D. No roots at all

Question 8

Solve $x^2+9=0$.

- A. $x=\pm 3$
- B. $x=\pm 3i$
- C. $x=3i$
- D. $x=\pm 9i$

Question 9

A polynomial with real coefficients has the zero $3+2i$. Which must also be a zero?

- A. $3-2i$
- B. $-3+2i$
- C. $-3-2i$
- D. $2+3i$

Question 10

How many complex zeros does a degree-6 polynomial have, counting multiplicity?

- A. 6
- B. 3
- C. 5
- D. 12

Answers

1. **A** - By definition i squared equals -1 .
2. **D** - 15 leaves remainder 3 when divided by 4, and $i^3 = -i$.
3. **B** - Add real parts and imaginary parts separately.
4. **D** - $3 - i + 6i - 2i^2 = 3 + 5i + 2 = 5 + 5i$. The mistake is forgetting that $i^2 = -1$.
5. **B** - The conjugate changes only the sign of the imaginary part.
6. **C** - The modulus is the distance $\sqrt{9 + 16} = 5$. Adding $3 + 4$ gives 7, which is not a distance.
7. **C** - No x -intercepts means a negative discriminant, which gives two complex conjugate roots.
8. **B** - $x^2 = -9$ gives $x = \text{plus or minus } 3i$.
9. **A** - Non-real zeros of real polynomials come in conjugate pairs.
10. **A** - The Fundamental Theorem of Algebra gives exactly n zeros for degree n .

Remember

- $i^2 = -1$, and powers of i repeat in a cycle of 4: $i, -1, -i, 1$.
- The conjugate of $a + bi$ is $a - bi$, and $(a + bi)(a - bi) = a^2 + b^2$.
- Modulus: $|a + bi| = \sqrt{a^2 + b^2}$, the distance from the origin in the complex plane.
- A negative discriminant gives two complex roots that are conjugates.
- Fundamental Theorem of Algebra: a degree- n polynomial has n complex zeros counting multiplicity.