2.5 Complex Numbers

Target 2C: Find Real and Complex Zeroes of Polynomials by Synthetic and Long Division

Review of Prior Concepts

Without a graphing calculator, find the zeroes of $f(x) = x^3 - x^2 - x - 2$. Identify if the zeroes are rational or irrational.

More Practice

Rational Zeroes Theorem

http://www.sparknotes.com/math/algebra2/polynomials/section4.rhtml
http://www.math-prof.com/Alg2/Alg2_Ch_16.asp
https://www.youtube.com/watch?v=7mNBBBspqUc

SAT Connection

Passport to Advanced Math

4. Create an equivalent form of an algebraic expression

Example: For $i = \sqrt{-1}$, what is the sum $(7 + 3i) + (-8 + 9i)$?

A) $-1 + 12i$
B) $-1 - 6i$
C) $15 + 12i$
D) $15 - 6i$

Solution

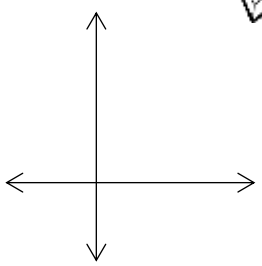
Standard Form of Complex Numbers

Fill in the key ideas from the definition p. 221

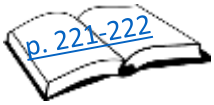
$a + bi$, where a and b are _____

and i = _____

Label the complex plane p. 225



https://www.mathsisfun.com/numbers/complex-numbers.html

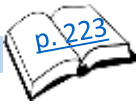


Examples:

Simplify and graph the solution.

1) $(2+i)-(7-3i)$ **2)** $(4+i)(3-2i)$ **3)** $(2+i)^3$

Complex Conjugates and Division



http://www.regentsprep.org/regents/math/algtrig/ato6/multlesson.htm

Vocabulary Term	In my own words…	Examples
Complex Conjugate		

Examples:

Write the complex number in standard form.

1) $\frac{3}{4-i}$ **2)** $\frac{2+5i}{3+i}$

Complex Solutions of Quadratic Equations

p. 224

When solving a quadratic equation, the discriminant (_____) tells whether the solutions are real or imaginary.

Discriminant	Symbolically	# & type of solutions
Positive		
Zero		
Negative		

Examples:

Solve the quadratic equation.

1) $x^2 + x + 11 = 5x - 8$

2) $3x^2 + x + 2 = 0$

More Practice

Complex Numbers and Solutions

http://www.regentsprep.org/regents/math/algtrig/ate3/quadcomlesson.htm
http://www.coolmath.com/algebra/10-complex-numbers/03-quadratic-formula-01
https://www.mathsisfun.com/numbers/complex-numbers.html
http://www.virtualnerd.com/algebra-2/quadratics/formula-discriminant/quadratic-formula/complex-solutions-quadratic-formula-example
https://www.youtube.com/watch?v=kpywdu1afas
https://www.youtube.com/watch?v=SP-YJe7Vldo
https://www.khanacademy.org/math/algebra2/introduction-to-complex-numbers-algebra-2

Homework Assignment

p.227 #1,7,9,17,20,33,41, 44,45,47

SAT Connection

Solution

Choice A is correct. To calculate $(7 + 3i) + (-8 + 9i)$, add the real parts of each complex number, $7 + (-8) = -1$, and then add the imaginary parts, $3i + 9i = 12i$. The result is $-1 + 12i$.

Choices B, C, and D are incorrect and likely result from common errors that arise when adding complex numbers. For example, choice B is the result of adding $3i$ and $-9i$, and choice C is the result of adding 7 and 8.