# The Simplicity of Complex Numbers

Teacher Quality Workshop 9/21/2016

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1. **PowerPoint:** What are complex numbers and why does anyone care?
2. **Arithmetic with Complex Numbers**

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| **Adding Complex Numbers**(4 – i) + (1 + 2i) = 5 + i(-11+2i) + (-9-i) = -20 + i | **Multiplying Complex Numbers**(1 + i) \* (4 + 3i) = 1 + 7i(1 + 7i) \* (4 + 3i) = -17 + 31iPowers of i |

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| Complex # | Root of the equation . . . |
| 4 – i | 0 = x2 – 8x + 17 |
| 1 + 2i | 0 = x2 – 2x + 5 |
| -11 + 2i | 0 = x2 +22x + 125 |
| -9-i | 0 = x2 + 18x + 82 |
| 1+i | 0 = x2 – 2x + 2 |
| 4+3i | 0 = x2 – 8x + 25 |
| 1+7i | 0 = x2 – 2x + 50 |
| -17+31 i | 0 = x2 + 34x + 1250 |

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1. **Plotting Complex Numbers**
2. **Geogebra tour**
	1. Plotting points
	2. Vectors
	3. Angles
3. **Geometric look at addition of complex numbers**
4. **Geometric look at multiplying by a complex number** – iterating with f(z) = m\*z
	1. m = 1 + 0.5i and z0 = 6 + 0i
	2. m = 0.87 + 0.5i and z0 = 6 + 0i
	3. m = i and z0 = 6 + 0i
5. **PowerPoint:** Euler’s Formula
6. **PowerPoint:** Polar Form of a Complex Number
7. **PowerPoint:** Polar Form of a Complex Number
8. **Trig Identities from Euler’s Formula**
9. **Useful resources:**

<https://www.math.toronto.edu/mathnet/questionCorner/complexinlife.html>

<https://betterexplained.com/articles/a-visual-intuitive-guide-to-imaginary-numbers/>