Questions?

Can you add, subtract, multiply polynomials?

Can you divide polymials?

Can you graph from an equation?

→ Find factors / roots

Can you equation from a graph?

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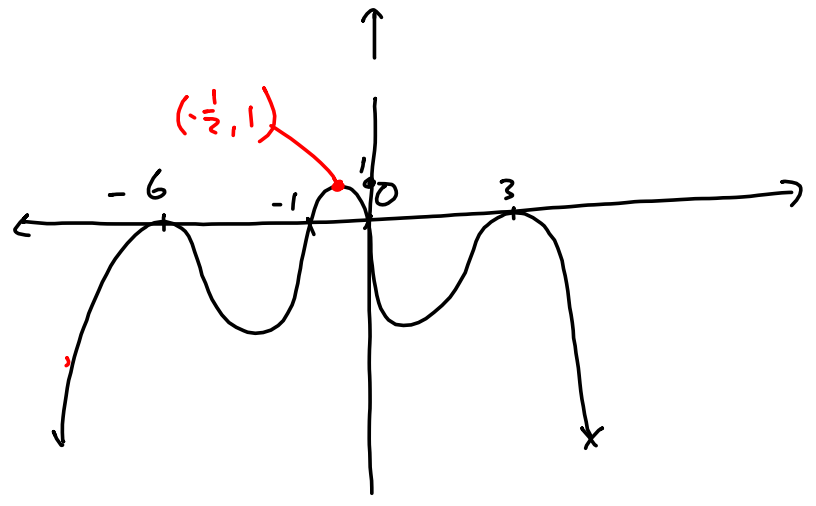

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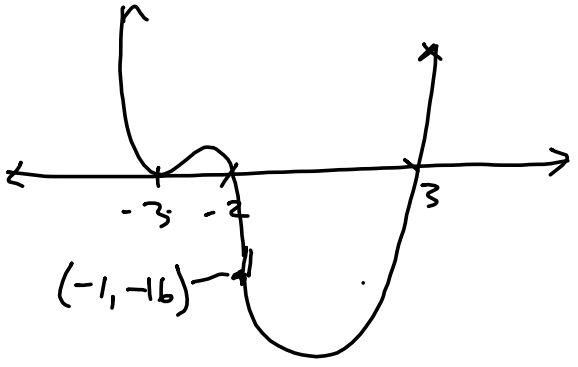

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$(X + 2)^7$

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Find roots $f(x) = x^4 - 13x^2 + 2$

Rewrite in factored form

Graph

$f(x) = x^4 + 7x^3 + 8x^2 - 28x - 48$

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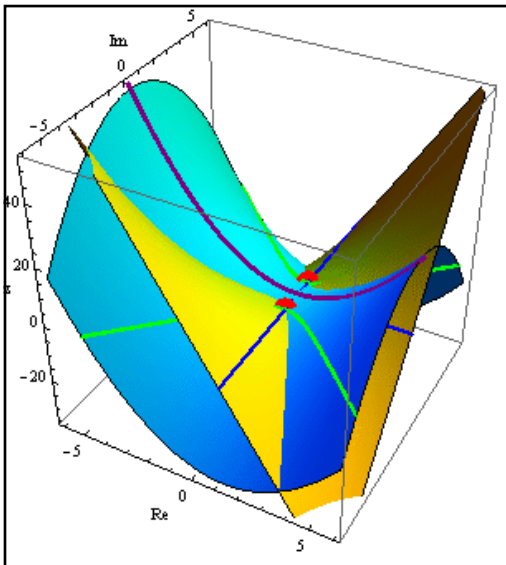
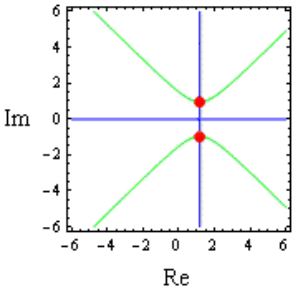


$$z^2 - 2.35\,z + 2.3$$



roots: $z = 1.175 - 0.95884\,i$

$z = 1.175 + 0.95884\,i$

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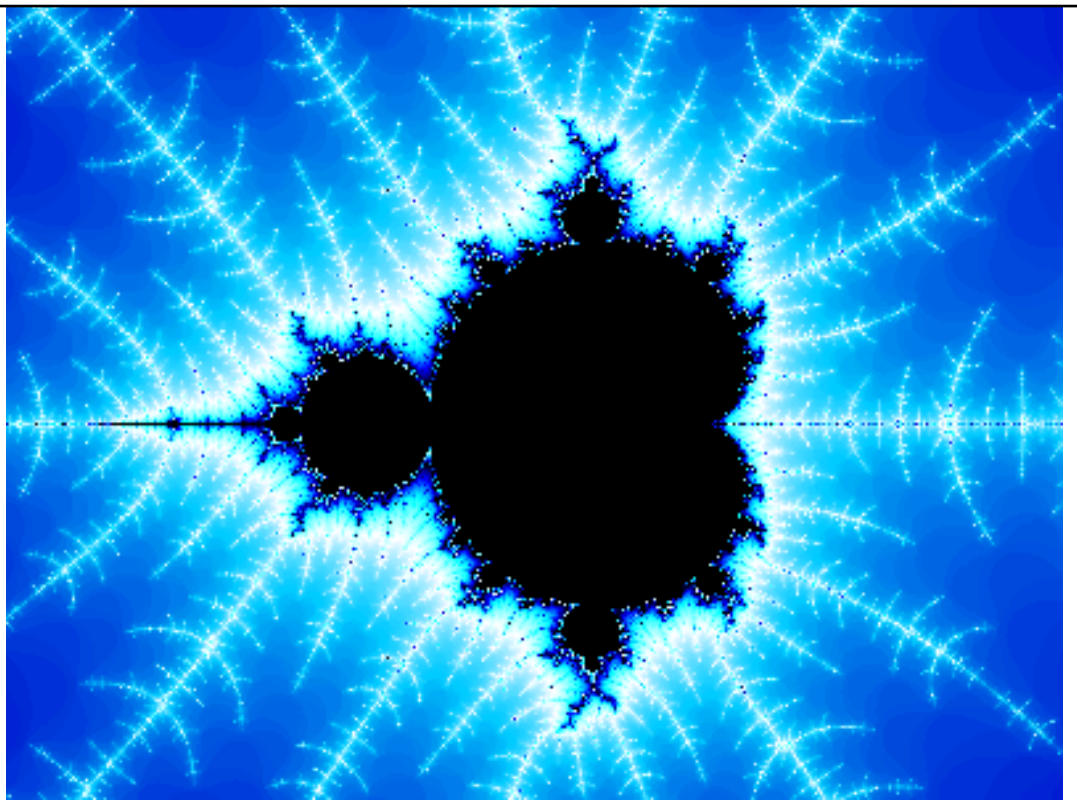

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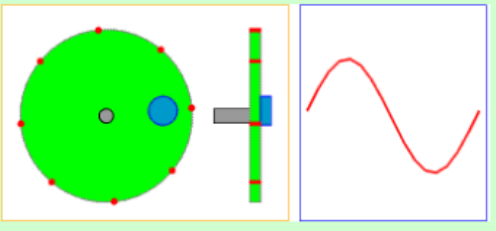
More Complex makes Simple!

Complex numbers are used a great deal in electronics. The main reason for this is they make the whole topic of analyzing and understanding alternating signals *much* easier. This seems odd at first, as the concept of using a mix of real and 'imaginary' numbers to explain things in the real world seem crazy! Once you get used to them, however, they do make a lot of things clearer. The problem is understanding what they 'mean' and how to use them in the first place. To help you get a clear picture of how they're used and what they mean we can look at a mechanical example...



AA7 Complex Numbers

a) I can perform arithmetic with complex numbers

b) I can find factors that have complex roots

hw 9-72 to 9-80

Work sheet: See web site.

Solve:

$\sqrt{2}$ =

$\sqrt{(-2)}$ =

Solve:

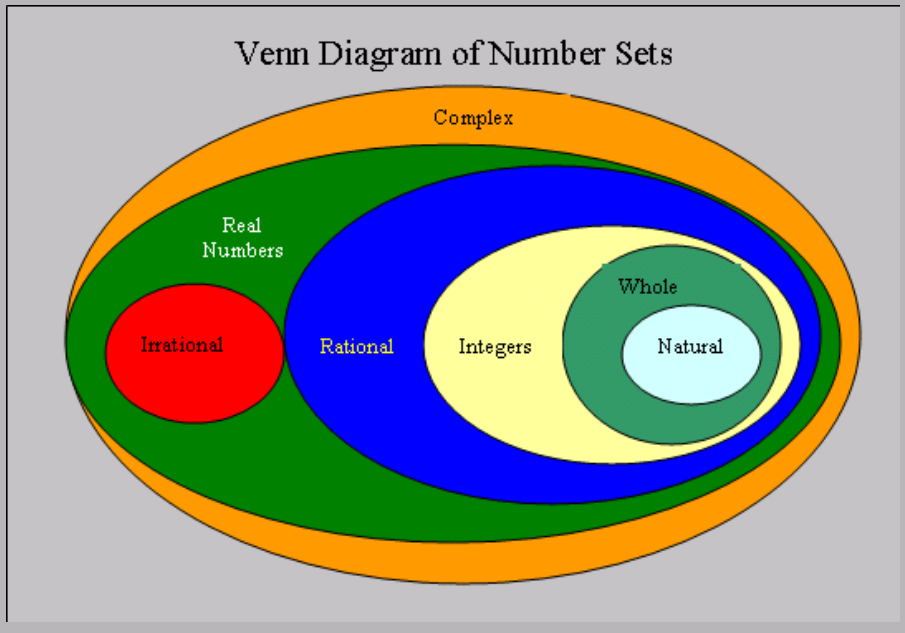
$\sqrt{-1}$ =

$\sqrt{(-4)}$ =

$\sqrt{(-16)}$ =

$\sqrt{(-12)}$ =

$a + bi$



http://www.st-andrews.ac.uk/~www_pa/Scots_Guide/info/signals/complex/cmplx.html

Arithmetic with complex numbers

$2i + 3i =$

$3i - 5i =$

$3i + 5 - i =$

$(6i - 7) - (5i + 2) =$

$(2i)(4i) =$

$(2 + i)\ (\ 2 + 3i) =$

$(5 + i)(5 - i) =$

$(2 + 3i)(3 + 4i) =$

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$i^0 =$

$i =$

$i^2 =$

$i^3 =$

$i^4 =$

$i^5 =$

$i^6 =$

$i^7 =$

Find the roots and factors of $y = x^2 - 2x + 1$

Find the roots and factors of $y = x^2 + 2x + 2$

Find the roots and factors of $y = x^2 + 6x + 12$

Find the roots and factors of $y = x^2 + 1$

Find the roots and factors of $y = x^2 + 4x + 9$

Multiply:

$(x + 2i)(x - 2i)$

$(x - 3i)(x - 3i)$

$(x + 2)(x - 2i)$

$(5 - 5i)(x + 2i)$

Multiply:

$(x - 5 + 2i)(x - 5 - 2i)$

hw 9-72 to 9-80

Work sheet: See web site.

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