

abstract_algebra

This worksheet illustrates how *Sage* can be used to do arithmetic in a variety of different rings. Hopefully the calculations here are more or less self-explanatory.

$Z7 = \text{Integers}(7)$

$Z7(1/2)$

4

$Z7(2).\text{sqrt}()$

3

$PR.<x> = \text{PolynomialRing}(Z7)$

$(x^2-2).\text{factor}()$

$(x + 3) \cdot (x + 4)$

$QT.<t> = \text{PolynomialRing}(QQ)$

$(t^2-2).\text{factor}()$

$(t^2 - 2)$

$RZ.<z> = \text{PolynomialRing}(RR)$

$(z^2-2).\text{factor}()$

$(z - 1.41421356237310) \cdot (z + 1.41421356237310)$

$(t^3-t^2+3*t-10).\text{factor}()$

$(t - 2) \cdot (t^2 + t + 5)$

$(z^3-z^2+3*z-10).\text{factor}()$

$(z - 2.000000000000000) \cdot (z^2 + z + 5.000000000000000)$

$CY.<y> = \text{PolynomialRing}(CC)$

$(y^3-y^2+3*y-10).\text{factor}()$

$(y - 2.000000000000000) \cdot (y + 0.500000000000000 - 2.17944947177034i) \cdot (y + 0.500000000000000 + 2.17944947177034i)$