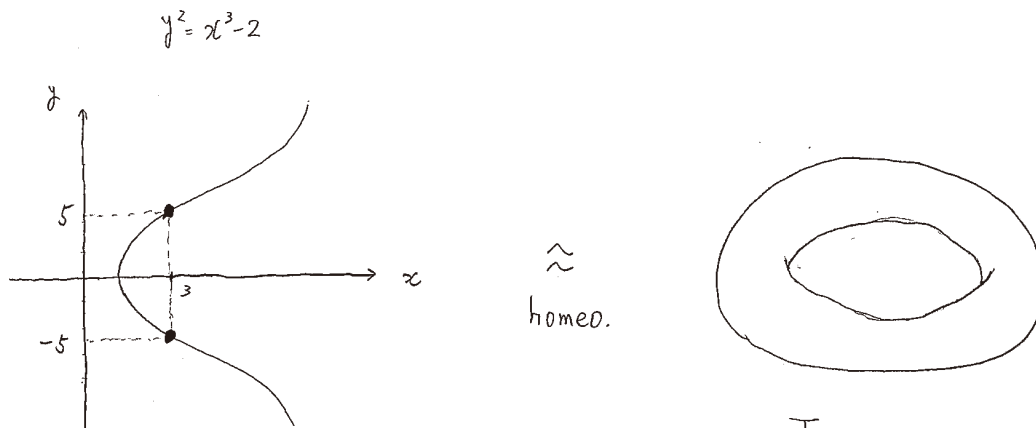# Elliptic Curve

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An elliptic curve is an algebraic curve defined by an equation of the form $y^2 = x^3 + a_2 x^2 + a_1 x + a_0$. Its genus is 1 (which means homeomorphic to torus), and it is the second simplest curve following the affine line (whose genus is 0). However, they are very difficult to study arithmetically. For example, the number of integral points (points whose x and y coordinates are both integers) is sometimes finite and infinite. BSD conjecture predicts that such a phenomenon is connected with L-function, and if you could prove this, you would earn 1 million dollars. It would be much easier to win the lottery, though.......

$$y^2 = x^3 - 2$$

It is known that there are only two integral points shown above (Fermat)

$\widetilde{\sim}$ homeo.

Torus (Doughnut)