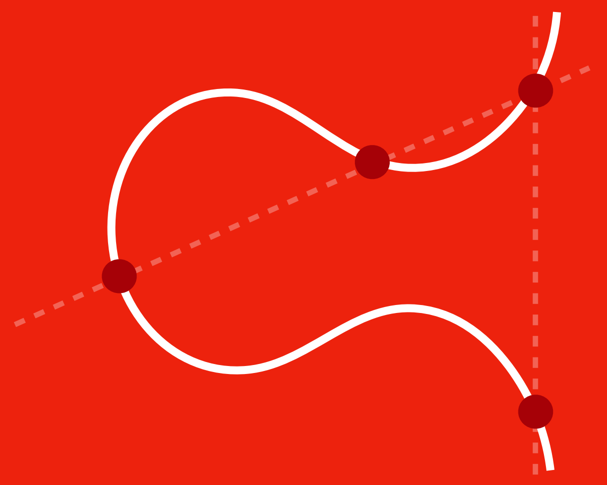
1

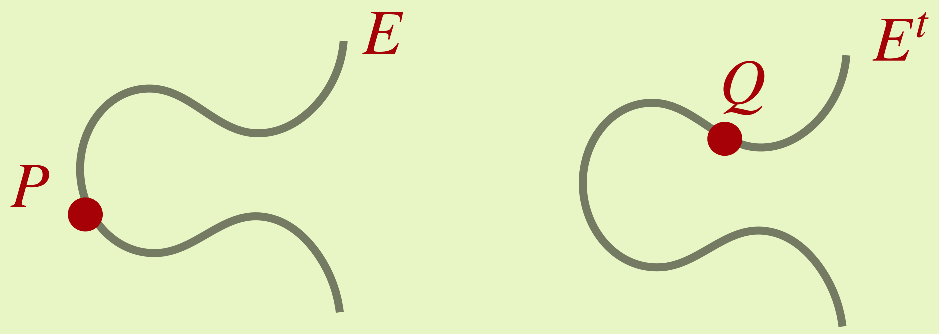


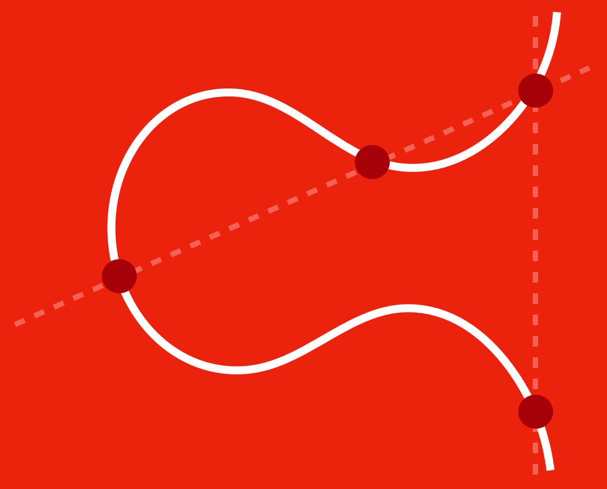
Isogenies & Pairings

the twist of *E*

Twist over $\mathbb{F}_p$ of supersingular curve E

- a curve E^t with $p+1$ points over $\mathbb{F}_p$
- isomorphic to a specific subset of $E(\mathbb{F}_{p^2})$
- used in CSIDH to "move backwards" in graph
- want $P \in E(\mathbb{F}_p)$ and $Q \in E^t(\mathbb{F}_p)$, both full order





Isogenies & Pairings

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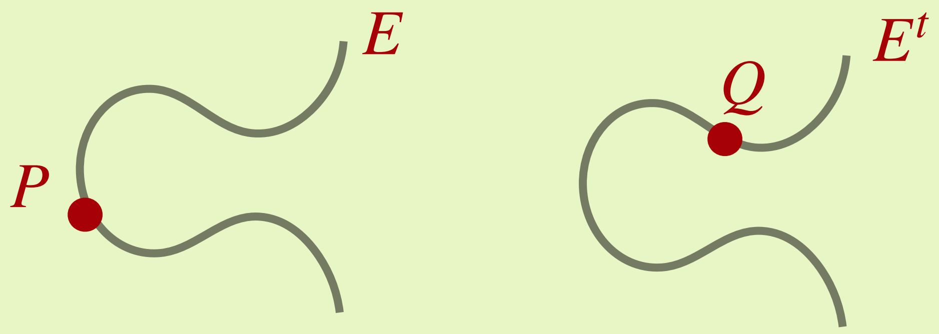

1

consider P and Q as

$$P = P_0 + P_1 + \ldots + P_n$$
$$Q = Q_0 + Q_1 + \ldots + Q_n$$

2

let $r = p + 1$

Tate pairing $e_r(P, Q)$ captures where **both** $P_i, Q_i \neq \mathcal{O}$