

## Tables of Hecke Eigenvalues

For each of the elliptic curves appearing in Table 10, we list a set of prime ideals  $\mathfrak{p}$  of  $F$  which suffice to prove modularity of the curve (for a more detailed discussion of how these primes were determined, we refer the reader to our exposition in [25]). The table below gives a list of the prime ideals of  $F$  of norm at most 650, together with a generator for each ideal (we use the convention that the prime  $\mathfrak{p}_{p,i}$  lies above the rational prime  $p$ ):

$\mathfrak{p}$	Generator	$\mathfrak{p}$	Generator	$\mathfrak{p}$	Generator
$\mathfrak{p}_2$	$-t^2 + t + 1$	$\mathfrak{p}_{181,3}$	$4t^3 + t^2 - t - 2$	$\mathfrak{p}_{397,1}$	$-4t^3 - 2t^2 + 3t - 1$
$\mathfrak{p}_3$	$t^2 + 1$	$\mathfrak{p}_{181,4}$	$2t^3 + t^2 - t - 4$	$\mathfrak{p}_{397,2}$	$t^3 + 3t^2 + 2t - 4$
$\mathfrak{p}_{13,1}$	$-t^3 + t^2 + 1$	$\mathfrak{p}_{193,1}$	$-t^3 + t^2 + 4t - 1$	$\mathfrak{p}_{397,3}$	$-t^3 + 3t^2 - 2t - 4$
$\mathfrak{p}_{13,2}$	$t^3 + t + 1$	$\mathfrak{p}_{193,2}$	$3t^2 - t - 4$	$\mathfrak{p}_{397,4}$	$-t^3 + 3t^2 + 4t - 2$
$\mathfrak{p}_{13,3}$	$-t^3 - t + 1$	$\mathfrak{p}_{193,3}$	$3t^2 + t - 4$	$\mathfrak{p}_{409,1}$	$-5t^3 + t^2 + t - 1$
$\mathfrak{p}_{13,4}$	$t^3 + t^2 + 1$	$\mathfrak{p}_{193,4}$	$t^3 + t^2 - 4t - 1$	$\mathfrak{p}_{409,2}$	$-t^3 + t^2 + t - 5$
$\mathfrak{p}_{5,1}$	$2t^2 - t - 2$	$\mathfrak{p}_{229,1}$	$-3t^3 + 2t^2 + 3t + 1$	$\mathfrak{p}_{409,3}$	$-3t^3 + 4t^2 - t - 4$
$\mathfrak{p}_{5,2}$	$t^3 - 2t^2 - t$	$\mathfrak{p}_{229,2}$	$-t^3 + 3t^2 - 2t - 3$	$\mathfrak{p}_{409,4}$	$4t^3 - 5t - 1$
$\mathfrak{p}_{37,1}$	$2t^3 + t^2 - 2$	$\mathfrak{p}_{229,3}$	$2t^3 - 3t^2 - 3t$	$\mathfrak{p}_{421,1}$	$3t^3 + t^2 - 2t - 5$
$\mathfrak{p}_{37,2}$	$t^3 - 2t^2 - 2t$	$\mathfrak{p}_{229,4}$	$-3t^3 - 2t^2 + 3t - 1$	$\mathfrak{p}_{421,2}$	$2t^3 + 4t^2 - 3t - 5$
$\mathfrak{p}_{37,3}$	$t^3 + t^2 - t - 3$	$\mathfrak{p}_{241,1}$	$4t^3 - 4t - 1$	$\mathfrak{p}_{421,3}$	$5t^3 - 3t - 2$
$\mathfrak{p}_{37,4}$	$3t^3 + t^2 - t - 1$	$\mathfrak{p}_{241,2}$	$-t^3 + 4t^2 - 4$	$\mathfrak{p}_{421,4}$	$-3t^3 + t^2 + 2t - 5$
$\mathfrak{p}_{7,1}$	$2t^3 - 3t$	$\mathfrak{p}_{241,3}$	$t^3 - t - 4$	$\mathfrak{p}_{433,1}$	$-3t^3 + 2t^2 + t - 5$
$\mathfrak{p}_{7,2}$	$t^3 - 3t$	$\mathfrak{p}_{241,4}$	$-4t^3 + t^2 - 1$	$\mathfrak{p}_{433,2}$	$5t^3 + t^2 - 2t - 3$
$\mathfrak{p}_{61,1}$	$-t^3 + t^2 + 3t - 1$	$\mathfrak{p}_{277,1}$	$3t^2 + 2t - 4$	$\mathfrak{p}_{433,3}$	$t^3 - 2t^2 - 5t$
$\mathfrak{p}_{61,2}$	$2t^2 - t - 3$	$\mathfrak{p}_{277,2}$	$2t^3 - t^2 - 3t - 4$	$\mathfrak{p}_{433,4}$	$3t^3 + 2t^2 - t - 5$
$\mathfrak{p}_{61,3}$	$2t^2 + t - 3$	$\mathfrak{p}_{277,3}$	$t^3 + 2t^2 - 4t - 2$	$\mathfrak{p}_{457,1}$	$3t^2 + 3t - 4$
$\mathfrak{p}_{61,4}$	$t^3 + t^2 - 3t - 1$	$\mathfrak{p}_{277,4}$	$2t^3 - 4t^2 + t - 1$	$\mathfrak{p}_{457,2}$	$-3t^3 - 3t^2 + 3t - 1$
$\mathfrak{p}_{73,1}$	$-t^3 - 3t^2$	$\mathfrak{p}_{17,1}$	$4t^2 - t - 4$	$\mathfrak{p}_{457,3}$	$3t^3 - 3t^2 - 3t - 1$
$\mathfrak{p}_{73,2}$	$2t^3 + 2t^2 - 3$	$\mathfrak{p}_{17,2}$	$t^3 - 4t^2 - t$	$\mathfrak{p}_{457,4}$	$t^3 + 3t^2 + 3t - 3$
$\mathfrak{p}_{73,3}$	$-2t^3 + 2t^2 - 3$	$\mathfrak{p}_{313,1}$	$-t^3 + 2t^2 + 3t - 5$	$\mathfrak{p}_{23,1}$	$2t^3 + 3t^2 - 2t - 6$
$\mathfrak{p}_{73,4}$	$-t^3 + 3t^2 + t - 3$	$\mathfrak{p}_{313,2}$	$t^3 - 4t^2 - 2t$	$\mathfrak{p}_{23,2}$	$-2t^3 + 3t^2 + 2t - 6$
$\mathfrak{p}_{97,1}$	$2t^3 + t^2 - 2t - 4$	$\mathfrak{p}_{313,3}$	$3t^3 + 3t^2 - t - 5$	$\mathfrak{p}_{541,1}$	$-2t^3 + 2t - 5$
$\mathfrak{p}_{97,2}$	$-2t^3 + 4t^2 - 1$	$\mathfrak{p}_{313,4}$	$t^3 + 2t^2 - 3t - 5$	$\mathfrak{p}_{541,2}$	$5t^3 - 3t - 3$
$\mathfrak{p}_{97,3}$	$-2t^3 - 4t^2 + 1$	$\mathfrak{p}_{337,1}$	$5t^3 + t^2 - 2t - 2$	$\mathfrak{p}_{541,3}$	$5t^3 - 5t - 2$
$\mathfrak{p}_{97,4}$	$-2t^3 + t^2 + 2t - 4$	$\mathfrak{p}_{337,2}$	$-2t^3 + 2t^2 + t - 5$	$\mathfrak{p}_{541,4}$	$-5t^2 - 2t$
$\mathfrak{p}_{109,1}$	$t^3 + t^2 - 2t - 4$	$\mathfrak{p}_{337,3}$	$2t^3 + 2t^2 - t - 5$	$\mathfrak{p}_{577,1}$	$-2t^3 + 3t^2 - 2t - 4$
$\mathfrak{p}_{109,2}$	$-2t^3 - 2t^2 + 2t - 1$	$\mathfrak{p}_{337,4}$	$-t^3 + 3t^2 + 2t - 5$	$\mathfrak{p}_{577,2}$	$-4t^3 - 2t^2 + 3t - 2$
$\mathfrak{p}_{109,3}$	$2t^3 - 2t^2 - 2t - 1$	$\mathfrak{p}_{349,1}$	$-2t^3 + 3t - 5$	$\mathfrak{p}_{577,3}$	$4t^3 - 2t^2 - 3t - 2$
$\mathfrak{p}_{109,4}$	$-t^3 + t^2 + 2t - 4$	$\mathfrak{p}_{349,2}$	$4t^3 - t^2 - 2t - 2$	$\mathfrak{p}_{577,4}$	$2t^3 - 4t^2 - 4t + 1$
$\mathfrak{p}_{11,1}$	$-3t^3 + t^2 + t - 3$	$\mathfrak{p}_{349,3}$	$t^3 + 2t^2 + 2t - 4$	$\mathfrak{p}_{601,1}$	$5t^3 - 5t - 1$
$\mathfrak{p}_{11,2}$	$t^3 + 2t^2 - 3t - 3$	$\mathfrak{p}_{349,4}$	$2t^3 - 3t - 5$	$\mathfrak{p}_{601,2}$	$-t^3 + 5t^2 - 5$
$\mathfrak{p}_{157,1}$	$-4t^3 + 2t - 1$	$\mathfrak{p}_{19,1}$	$2t^3 - 5t$	$\mathfrak{p}_{601,3}$	$t^3 - t - 5$
$\mathfrak{p}_{157,2}$	$-t^3 + 2t^2 - 4$	$\mathfrak{p}_{19,2}$	$3t^3 - 5t$	$\mathfrak{p}_{601,4}$	$-5t^3 + t^2 - 1$
$\mathfrak{p}_{157,3}$	$t^3 + 2t^2 - 4$	$\mathfrak{p}_{373,1}$	$4t^3 + 2t^2 - 2t - 5$	$\mathfrak{p}_{613,1}$	$t^3 + 2t^2 - 5t - 2$
$\mathfrak{p}_{157,4}$	$4t^3 - 2t - 1$	$\mathfrak{p}_{373,2}$	$2t^3 + 3t^2 - 4t - 5$	$\mathfrak{p}_{613,2}$	$4t^2 - 2t - 5$
$\mathfrak{p}_{181,1}$	$-2t^3 + t^2 + t - 4$	$\mathfrak{p}_{373,3}$	$5t^3 - 3t - 1$	$\mathfrak{p}_{613,3}$	$4t^2 + 2t - 5$
$\mathfrak{p}_{181,2}$	$t^3 - 2t^2 - 4t$	$\mathfrak{p}_{373,4}$	$3t^3 + t^2 - 5t - 1$	$\mathfrak{p}_{613,4}$	$-t^3 + 2t^2 + 5t - 2$

For each class, we list the Hecke eigenvalues for the specified set of prime ideals, which were computed using the ideas of the previous sections. In each case, we have verified that these eigenvalues match the local data of the corresponding elliptic curve, thus proving that each curve is indeed modular.

**Class 441**

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{73,1}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{37,4}, \mathfrak{p}_{7,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{61,3}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,2}, \mathfrak{p}_{109,2}, \mathfrak{p}_{109,3}, \mathfrak{p}_{11,1}, \mathfrak{p}_{181,2}, \mathfrak{p}_{181,3}, \mathfrak{p}_{193,1}, \mathfrak{p}_{17,1}, \mathfrak{p}_{313,1}, \mathfrak{p}_{337,1}, \mathfrak{p}_{349,1}, \mathfrak{p}_{349,4}, \mathfrak{p}_{19,1}, \mathfrak{p}_{409,2}, \mathfrak{p}_{23,1}, \mathfrak{p}_{601,2}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	-6	4	4	-6	-4	-4	-2	-2
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{97,1}$
$a_{\mathfrak{p}}$	-2	-2	10	2	2	14	4	-2
$\mathfrak{p}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{109,2}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{11,1}$	$\mathfrak{p}_{181,2}$	$\mathfrak{p}_{181,3}$	$\mathfrak{p}_{193,1}$	$\mathfrak{p}_{17,1}$
$a_{\mathfrak{p}}$	8	10	10	2	-8	-8	-26	-20
$\mathfrak{p}$	$\mathfrak{p}_{313,1}$	$\mathfrak{p}_{337,1}$	$\mathfrak{p}_{349,1}$	$\mathfrak{p}_{349,4}$	$\mathfrak{p}_{19,1}$	$\mathfrak{p}_{409,2}$	$\mathfrak{p}_{23,1}$	$\mathfrak{p}_{601,2}$
$a_{\mathfrak{p}}$	34	-22	-30	-30	2	30	10	22

TABLE 1: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 441

**Class 1156**

The residual representation attached to the corresponding elliptic curve has trivial image, and the prime  $\mathfrak{p}_{13,1}$  suffices to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,3}, \mathfrak{p}_{97,3}, \mathfrak{p}_{109,2}, \mathfrak{p}_{109,4}, \mathfrak{p}_{457,1}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,3}$
$a_{\mathfrak{p}}$	0	4	4	-6	-6	6	-2	-2
$\mathfrak{p}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,3}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{109,2}$	$\mathfrak{p}_{109,4}$	$\mathfrak{p}_{457,1}$	
$a_{\mathfrak{p}}$	-10	4	-6	-2	10	10	18	

TABLE 2: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 1156

**Class 2041**

The residual representation attached to the corresponding elliptic curve has trivial image, and the prime  $\mathfrak{p}_{13,1}$  suffices to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{37,4}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{61,3}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,3}, \mathfrak{p}_{73,4}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,2}, \mathfrak{p}_{97,4}, \mathfrak{p}_{109,1}, \mathfrak{p}_{109,2}, \mathfrak{p}_{109,4}, \mathfrak{p}_{181,1}, \mathfrak{p}_{193,1}, \mathfrak{p}_{229,3}, \mathfrak{p}_{17,1}, \mathfrak{p}_{313,1}, \mathfrak{p}_{313,4}, \mathfrak{p}_{373,1}, \mathfrak{p}_{409,1}, \mathfrak{p}_{1321,1}\}$ , where  $\mathfrak{p}_{1321,1}$  is generated by the element  $-3t^3 - 8t^2 - t + 3$ , suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	-2	2	2	-4	-4	-10	2	2
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,3}$	$\mathfrak{p}_{73,4}$
$a_{\mathfrak{p}}$	2	8	2	-10	8	-16	14	-10
$\mathfrak{p}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{97,4}$	$\mathfrak{p}_{109,1}$	$\mathfrak{p}_{109,2}$	$\mathfrak{p}_{109,4}$	$\mathfrak{p}_{181,1}$	$\mathfrak{p}_{193,1}$
$a_{\mathfrak{p}}$	2	2	-4	2	2	-10	2	-22
$\mathfrak{p}$	$\mathfrak{p}_{229,3}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{313,1}$	$\mathfrak{p}_{313,4}$	$\mathfrak{p}_{373,1}$	$\mathfrak{p}_{409,1}$	$\mathfrak{p}_{1321,1}$	
$a_{\mathfrak{p}}$	-4	2	-10	14	-10	32	-10	

TABLE 3: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 2041

**Class 2257**

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{37,3}, \mathfrak{p}_{61,1}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,3}, \mathfrak{p}_{109,3}, \mathfrak{p}_{193,1}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$
$a_{\mathfrak{p}}$	-4	-1	1	-6	-3	1
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{193,1}$
$a_{\mathfrak{p}}$	-3	-12	0	-10	8	-10

TABLE 4: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 2257**Class 2452**

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,2}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{7,2}, \mathfrak{p}_{61,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	1	-4	-4	8	2
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{7,2}$	$\mathfrak{p}_{61,3}$	
$a_{\mathfrak{p}}$	11	-4	-4	-10	

TABLE 5: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 2452**Class 2500a**

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{37,1}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{61,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,2}$
$a_{\mathfrak{p}}$	4	-1	-1	1
$\mathfrak{p}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{61,3}$
$a_{\mathfrak{p}}$	-7	-2	-7	-8

TABLE 6: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 2500a

**Class 2977**

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{5,2}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{37,4}, \mathfrak{p}_{7,2}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,3}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,2}, \mathfrak{p}_{109,2}, \mathfrak{p}_{109,3}, \mathfrak{p}_{157,2}, \mathfrak{p}_{157,4}, \mathfrak{p}_{229,1}, \mathfrak{p}_{229,2}, \mathfrak{p}_{241,3}, \mathfrak{p}_{17,1}, \mathfrak{p}_{313,1}, \mathfrak{p}_{19,1}, \mathfrak{p}_{397,3}, \mathfrak{p}_{409,2}, \mathfrak{p}_{409,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	4	2	-4	-4	2	-10	2	-10
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{7,2}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{73,3}$
$a_{\mathfrak{p}}$	-10	2	8	-10	2	-4	14	2
$\mathfrak{p}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{109,2}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{157,2}$	$\mathfrak{p}_{157,4}$	$\mathfrak{p}_{229,1}$	$\mathfrak{p}_{229,2}$
$a_{\mathfrak{p}}$	2	14	14	-10	2	-16	8	2
$\mathfrak{p}$	$\mathfrak{p}_{241,3}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{313,1}$	$\mathfrak{p}_{19,1}$	$\mathfrak{p}_{397,3}$	$\mathfrak{p}_{409,2}$	$\mathfrak{p}_{409,3}$	
$a_{\mathfrak{p}}$	14	8	-10	2	2	14	2	

TABLE 7: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 2977

**Class 3328**

The residual representation attached to the corresponding elliptic curve has trivial image. Using the methods outlined in [?], one can immediately deduce that the residual representations are isomorphic. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,4}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,4}, \mathfrak{p}_{97,1}, \mathfrak{p}_{17,1}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	2	-2	-2	6	2	-6	-10	-2
$\mathfrak{p}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,4}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{17,1}$	
$a_{\mathfrak{p}}$	6	-2	-2	10	10	18	2	

TABLE 8: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 3328

**Class 3721b**

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,3}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{7,2}, \mathfrak{p}_{61,3}, \mathfrak{p}_{61,4}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,2}, \mathfrak{p}_{109,1}, \mathfrak{p}_{109,3}, \mathfrak{p}_{157,1}, \mathfrak{p}_{157,3}, \mathfrak{p}_{181,1}, \mathfrak{p}_{181,2}, \mathfrak{p}_{181,3}, \mathfrak{p}_{181,4}, \mathfrak{p}_{193,1}, \mathfrak{p}_{17,1}, \mathfrak{p}_{337,1}, \mathfrak{p}_{19,1}, \mathfrak{p}_{409,1}, \mathfrak{p}_{409,3}, \mathfrak{p}_{601,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,3}$
$a_{\mathfrak{p}}$	-2	-4	-4	2	2	8	-10	-2
$\mathfrak{p}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{7,2}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{61,4}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,2}$
$a_{\mathfrak{p}}$	2	2	2	2	2	2	14	14
$\mathfrak{p}$	$\mathfrak{p}_{109,1}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{157,1}$	$\mathfrak{p}_{157,3}$	$\mathfrak{p}_{181,1}$	$\mathfrak{p}_{181,2}$	$\mathfrak{p}_{181,3}$	$\mathfrak{p}_{181,4}$
$a_{\mathfrak{p}}$	-4	-4	-10	-10	2	2	2	2
$\mathfrak{p}$	$\mathfrak{p}_{193,1}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{337,1}$	$\mathfrak{p}_{19,1}$	$\mathfrak{p}_{409,1}$	$\mathfrak{p}_{409,3}$	$\mathfrak{p}_{601,3}$	
$a_{\mathfrak{p}}$	14	32	2	20	-22	-22	20	

TABLE 9: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 3721b

**Class 4033a**

The residual representation attached to the corresponding elliptic curve has trivial image, and the prime  $\mathfrak{p}_{13,1}$  suffices to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,3}, \mathfrak{p}_{61,4}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,3}, \mathfrak{p}_{73,4}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,2}, \mathfrak{p}_{97,3}, \mathfrak{p}_{109,1}, \mathfrak{p}_{109,2}, \mathfrak{p}_{157,4}, \mathfrak{p}_{277,1}, \mathfrak{p}_{17,1}, \mathfrak{p}_{17,2}, \mathfrak{p}_{337,4}, \mathfrak{p}_{349,2}, \mathfrak{p}_{373,1}, \mathfrak{p}_{409,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$
$a_{\mathfrak{p}}$	4	2	-4	2	2	2	-4	2
$\mathfrak{p}$	$\mathfrak{p}_{37,2}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{61,4}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$
$a_{\mathfrak{p}}$	2	2	-4	2	14	-10	2	2
$\mathfrak{p}$	$\mathfrak{p}_{73,3}$	$\mathfrak{p}_{73,4}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{109,1}$	$\mathfrak{p}_{109,2}$	$\mathfrak{p}_{157,4}$
$a_{\mathfrak{p}}$	2	2	-16	2	14	2	-16	-4
$\mathfrak{p}$	$\mathfrak{p}_{277,1}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{17,2}$	$\mathfrak{p}_{337,4}$	$\mathfrak{p}_{349,2}$	$\mathfrak{p}_{373,1}$	$\mathfrak{p}_{409,3}$	
$a_{\mathfrak{p}}$	-10	2	2	2	32	14	-10	

TABLE 10: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4033a**Class 4033b**

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,2}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{61,3}, \mathfrak{p}_{61,4}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,3}, \mathfrak{p}_{73,4}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,2}, \mathfrak{p}_{97,3}, \mathfrak{p}_{109,1}, \mathfrak{p}_{109,2}, \mathfrak{p}_{109,4}, \mathfrak{p}_{157,4}, \mathfrak{p}_{17,2}, \mathfrak{p}_{313,4}, \mathfrak{p}_{373,1}, \mathfrak{p}_{409,2}, \mathfrak{p}_{409,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$
$a_{\mathfrak{p}}$	-2	-4	2	2	2	-4	2	2
$\mathfrak{p}$	$\mathfrak{p}_{37,2}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{61,4}$	$\mathfrak{p}_{73,1}$
$a_{\mathfrak{p}}$	2	2	-10	8	-4	8	2	2
$\mathfrak{p}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{73,3}$	$\mathfrak{p}_{73,4}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{109,1}$	$\mathfrak{p}_{109,2}$
$a_{\mathfrak{p}}$	2	2	-16	-10	8	-10	2	2
$\mathfrak{p}$	$\mathfrak{p}_{109,4}$	$\mathfrak{p}_{157,4}$	$\mathfrak{p}_{17,2}$	$\mathfrak{p}_{313,4}$	$\mathfrak{p}_{373,1}$	$\mathfrak{p}_{409,2}$	$\mathfrak{p}_{409,3}$	
$a_{\mathfrak{p}}$	2	-10	20	26	-34	2	14	

TABLE 11: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4033b**Class 4057**

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,2}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,2}, \mathfrak{p}_{61,2}, \mathfrak{p}_{61,4}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,1}$
$a_{\mathfrak{p}}$	-2	-4	-1	-4	-5
$\mathfrak{p}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,2}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{61,4}$	
$a_{\mathfrak{p}}$	-2	4	-13	10	

TABLE 12: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4057

**Class 4069**

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,2}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{61,3}, \mathfrak{p}_{73,2}, \mathfrak{p}_{97,2}, \mathfrak{p}_{97,3}, \mathfrak{p}_{109,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	-3	1	-5	1	-7	-10
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{109,3}$
$a_{\mathfrak{p}}$	-2	-12	14	10	8	-10

TABLE 13: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4069

**Class 4225b**

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,3}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{37,4}, \mathfrak{p}_{7,1}, \mathfrak{p}_{7,2}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,3}, \mathfrak{p}_{61,4}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,3}, \mathfrak{p}_{97,2}, \mathfrak{p}_{97,3}, \mathfrak{p}_{109,3}, \mathfrak{p}_{11,1}, \mathfrak{p}_{157,2}, \mathfrak{p}_{157,4}, \mathfrak{p}_{181,4}, \mathfrak{p}_{193,4}, \mathfrak{p}_{229,1}, \mathfrak{p}_{229,2}, \mathfrak{p}_{17,1}, \mathfrak{p}_{313,3}, \mathfrak{p}_{409,1}, \mathfrak{p}_{409,2}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$	$\mathfrak{p}_{37,3}$
$a_{\mathfrak{p}}$	-2	-4	-2	-6	4	0	-2	-6
$\mathfrak{p}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{7,2}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{61,4}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$
$a_{\mathfrak{p}}$	-2	-6	2	-6	-10	-2	8	2
$\mathfrak{p}$	$\mathfrak{p}_{73,3}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{11,1}$	$\mathfrak{p}_{157,2}$	$\mathfrak{p}_{157,4}$	$\mathfrak{p}_{181,4}$
$a_{\mathfrak{p}}$	-14	-2	6	14	-12	-6	4	-10
$\mathfrak{p}$	$\mathfrak{p}_{193,4}$	$\mathfrak{p}_{229,1}$	$\mathfrak{p}_{229,2}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{313,3}$	$\mathfrak{p}_{409,1}$	$\mathfrak{p}_{409,2}$	
$a_{\mathfrak{p}}$	-2	-14	20	-24	-10	10	-38	

TABLE 14: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4225b

**Class 4516**

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{37,3}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,3}, \mathfrak{p}_{7,1}, \mathfrak{p}_{73,1}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,1}$
$a_{\mathfrak{p}}$	5	4	-1	-6	-4
$\mathfrak{p}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{7,1}$	$\mathfrak{p}_{73,1}$
$a_{\mathfrak{p}}$	6	-12	3	-10	-11

TABLE 15: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4516

### Class 4672

The residual representation attached to the corresponding elliptic curve has trivial image. Using the methods outlined in [?], one can immediately deduce that the residual representations are isomorphic. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{13,4}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{61,3}, \mathfrak{p}_{61,4}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,3}, \mathfrak{p}_{97,2}, \mathfrak{p}_{109,1}, \mathfrak{p}_{17,2}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{13,4}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,3}$
$a_{\mathfrak{p}}$	2	-2	-2	-2	6	-6	2	6
$\mathfrak{p}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{61,4}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{73,3}$	$\mathfrak{p}_{97,2}$	$\mathfrak{p}_{109,1}$	$\mathfrak{p}_{17,2}$	
$a_{\mathfrak{p}}$	-2	-10	-6	10	2	14	-30	

TABLE 16: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4672

### Class 4852

The residual representation attached to the corresponding elliptic curve has image isomorphic to  $S_3$ , and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{61,2}, \mathfrak{p}_{61,3}, \mathfrak{p}_{73,2}, \mathfrak{p}_{97,3}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$
$a_{\mathfrak{p}}$	-3	-1	-7	-2	3	-8
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{97,3}$	
$a_{\mathfrak{p}}$	2	-12	4	14	6	

TABLE 17: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 4852

### Class 5317

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,2}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,4}, \mathfrak{p}_{7,2}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{61,3}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,4}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,3}, \mathfrak{p}_{97,4}, \mathfrak{p}_{109,3}, \mathfrak{p}_{157,2}, \mathfrak{p}_{157,3}, \mathfrak{p}_{181,1}, \mathfrak{p}_{181,2}, \mathfrak{p}_{193,2}, \mathfrak{p}_{277,4}, \mathfrak{p}_{17,1}, \mathfrak{p}_{313,2}, \mathfrak{p}_{373,3}, \mathfrak{p}_{409,1}, \mathfrak{p}_{457,1}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_{\mathfrak{p}}$	2	-2	6	-2	2	2	6	-10
$\mathfrak{p}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{7,2}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{61,3}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{73,4}$
$a_{\mathfrak{p}}$	6	2	-2	-10	-10	10	10	10
$\mathfrak{p}$	$\mathfrak{p}_{97,1}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{97,4}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{157,2}$	$\mathfrak{p}_{157,3}$	$\mathfrak{p}_{181,1}$	$\mathfrak{p}_{181,2}$
$a_{\mathfrak{p}}$	-14	2	-6	-2	-2	-2	-2	22
$\mathfrak{p}$	$\mathfrak{p}_{193,2}$	$\mathfrak{p}_{277,4}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{313,2}$	$\mathfrak{p}_{373,3}$	$\mathfrak{p}_{409,1}$	$\mathfrak{p}_{457,1}$	
$a_{\mathfrak{p}}$	2	6	34	-22	22	10	-22	

TABLE 18: Eigenvalues  $a_{\mathfrak{p}}$  of the Hecke operators  $T_{\mathfrak{p}}$  on class 5317

### Class 5473

The residual representation attached to the corresponding elliptic curve has trivial image, and the primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}\}$  suffice to prove isomorphism of the residual representations. The primes  $\{\mathfrak{p}_3, \mathfrak{p}_{13,1}, \mathfrak{p}_{13,2}, \mathfrak{p}_{13,3}, \mathfrak{p}_{5,1}, \mathfrak{p}_{5,2}, \mathfrak{p}_{37,1}, \mathfrak{p}_{37,2}, \mathfrak{p}_{37,3}, \mathfrak{p}_{37,4}, \mathfrak{p}_{61,1}, \mathfrak{p}_{61,2}, \mathfrak{p}_{73,1}, \mathfrak{p}_{73,2}, \mathfrak{p}_{73,4}, \mathfrak{p}_{97,1}, \mathfrak{p}_{97,3}, \mathfrak{p}_{97,4}, \mathfrak{p}_{109,1}, \mathfrak{p}_{109,3}, \mathfrak{p}_{109,4}, \mathfrak{p}_{157,1}, \mathfrak{p}_{157,2}, \mathfrak{p}_{181,4}, \mathfrak{p}_{193,2}, \mathfrak{p}_{17,1}, \mathfrak{p}_{313,1}, \mathfrak{p}_{313,3}, \mathfrak{p}_{349,1}, \mathfrak{p}_{409,2}, \mathfrak{p}_{457,4}\}$  suffice to prove isomorphism of the full representations.

$\mathfrak{p}$	$\mathfrak{p}_3$	$\mathfrak{p}_{13,1}$	$\mathfrak{p}_{13,2}$	$\mathfrak{p}_{13,3}$	$\mathfrak{p}_{5,1}$	$\mathfrak{p}_{5,2}$	$\mathfrak{p}_{37,1}$	$\mathfrak{p}_{37,2}$
$a_p$	-2	2	2	4	2	8	2	-4
$\mathfrak{p}$	$\mathfrak{p}_{37,3}$	$\mathfrak{p}_{37,4}$	$\mathfrak{p}_{61,1}$	$\mathfrak{p}_{61,2}$	$\mathfrak{p}_{73,1}$	$\mathfrak{p}_{73,2}$	$\mathfrak{p}_{73,4}$	$\mathfrak{p}_{97,1}$
$a_p$	2	2	14	8	14	14	14	8
$\mathfrak{p}$	$\mathfrak{p}_{97,3}$	$\mathfrak{p}_{97,4}$	$\mathfrak{p}_{109,1}$	$\mathfrak{p}_{109,3}$	$\mathfrak{p}_{109,4}$	$\mathfrak{p}_{157,1}$	$\mathfrak{p}_{157,2}$	$\mathfrak{p}_{181,4}$
$a_p$	8	2	2	14	-10	-4	-22	2
$\mathfrak{p}$	$\mathfrak{p}_{193,2}$	$\mathfrak{p}_{17,1}$	$\mathfrak{p}_{313,1}$	$\mathfrak{p}_{313,3}$	$\mathfrak{p}_{349,1}$	$\mathfrak{p}_{409,2}$	$\mathfrak{p}_{457,4}$	
$a_p$	-22	-10	8	-10	2	-22	-12	

TABLE 19: Eigenvalues  $a_p$  of the Hecke operators  $T_p$  on class 5473

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