Hints for exercises in chapter 10

Exercise 10.3.2. Hopefully $n = pq$ and $\phi(n) = de - 1 = 29 \times 197 - 1 = 5712$; if so, then $p + q = n + 1 - \phi(n) = 180$. Therefore $(x - p)(x - q) = x^2 - 180x + 5891$ which we factor to obtain p and q.

Exercise 10.4.2(b). Use Corollary 7.5.3.

Exercise 10.7.5. Since n is a Carmichael number we know that it is squarefree and has prime divisors p and q, by Lemma 7.6.1. If $a^{(n-1)/2} \equiv -1 \pmod{n}$, then let $b \equiv 1 \pmod{p}$ and $b \equiv a \pmod{q}$, and determine the value of $b^{(n-1)/2} \pmod{pq}$.

Exercise 10.8.6(a). Factor $4x^4 + 1$ and substitute in $x = 2^n$.

Exercise 10.19.1(c). Use the quadratic reciprocity law for 2 and -2.