§16.7 #3, 4, 8

Problems not from the book:
In each of the following exercises, determine the Galois group of the splitting field of the given polynomial over \( \mathbb{Q} \), and draw the lattice of intermediate field extensions. [Hint: how do Galois elements act on the square root of the discriminant? Refer to problem 16.6.1 from last week.]

1. \( x^3 - 2x + 4 \)
2. \( x^3 + x + 1 \)
3. \( x^3 - 3x + 1 \)