Factor the following polynomials. Show at least one intermediate step for each.

1 $6az - 2a - 9bz + 3b$

First I put these terms in standard order (degree 2 before degree 1, with a before b within each degree):

$$6az - 9bz - 2a - 3b.$$

(In this case, it still works out if you skip this step.) These terms have no common factor; since there are 4 of them, I separate them into two groups:

$$(6az - 9bz) + (-2a - 3b).$$

Each of these has a common factor that I can bring out:

$$3z(2a - 3b) - 1(2a + 3b).$$

Luckily, what remains is the same in both groups, so I can finish:

$$(2a - 3b)(3z - 1).$$

If you give the answer as $(3z - 1)(2a - 3b)$, this is also correct.

2 $q^2 - 4q - 45$

These terms are already in standard order, and there are 3 of them; since the first term is just the square of the variable, I only have to find two numbers that multiply to -45 and add to -4. Here are my attempts:

$$1 + -45 = -44;$$
$$3 + -15 = -12;$$
$$5 + -9 = -4.$$

So the numbers that I want are 5 and -9. Since the first term is simply the square of the variable, I can jump right to the answer:

$$(q + 5)(q - 9).$$