In our universe, like charges repel and opposites attract. Imagine another universe where opposite charges repel each other, while charges of the same charge attract. What would that be like? Consider both very large and very small phenomena. Try to connect that hypothetical condition to whatever conclusions you draw rather than just fantasizing something vague.

Start with some basic consequences

On a large scale, this would disrupt the electromagnetic field of earth itself. This would leave the earth without a protective layer, and the planet could easily be engulfed in a solar flare. **On a small scale, this would change everything that we use that runs on electricity. For example, jumper cables would not be useful in getting energy to your car battery as the electrons would not flow correctly between opposite charges**.

Realize that fundamental interactions are disrupted

If opposite charges attracted, then **all matter in the universe would completely be restructured.** The reason matter can exist past the quantum level is that molecules are held by their shapes due to electric forces (the net charges of a negative particle and a positive particle allow them to be attracted to each other), and without that force attracting and repelling then **every conceivable molecule we have observed would no longer be able to naturally occur**. On a larger scale, it would mean that many of our electrical systems would break down, as the transfer of electrons would no longer occur when they are attracted to oppositely charged matter, among many other ramifications.

Eventually conclude that nothing could persist in its present state!

In terms of a small scale phenomenon, at the atomic level, the charges of an electron and proton would now repel each other. **So, if opposites don't attract, the atom itself couldn't exist. So maybe this universe would be composed of clumps of electrons and clumps of protons**. On a bit of a larger scale, magnets are a classic example of charges. I have distinct memories from my childhood trying to get the positives ends of two different magnets to touch. **In our universe, the attraction of opposite charges allows charges to cancel out and a state of relative neutrality to exist. In the alternate universe, this is not possible. It would be made up of groups of positive and negative charges. As these groups continue to grow bigger, they keep accumulating more and more like charges. I would imagine that eventually, the positive and negative charges would be entirely separated**.

Given the universal constants
Newton's constant: G = 6.7 * 10^-11 N m2 / kg2
Coulomb's constant: ke = 9 * 10^9 N m2/C2
the electron and proton masses: me = 9 * 10^-31 kg, mp = 1836 * me = 1.7 * 10^-27 kg
and the elementary unit of charge: e = 1.6 * 10^-19 C
Estimate the ratio of the electric force between a proton and an electron relative to the gravitational force between them (Fe / Fg). Assume they are separated by one meter from each other. And don't use your calculator! Concentrate on getting the order of magnitude right (and show your work!)

Good example with appropriate rounding, but adding exponents in head

The force of gravity can be estimated by multiplying the electron and proton masses and Newton's constant:
(7*10^-11 Nm^2/kg^2)(9*10^-31 kg)(2*10^-27 kg) = 1.26 * 10^-67 Nm^2.
To get the electric force, you multiply Coulomb's constant by the square of the elementary unit of charge:
(9*10^9 Nm^2/C^2)(2*10^-19)^2 = 3.6*10^-28.
Therefore, the ratio of the force between a proton and electron relative to the gravitational force between them is
10^-28/10^-67, or **10^39**.

Clear calculation with all the intermediate steps

The gravitational force between them would be equal to

F_g= (-6.7 * 10^-11 N m^2/kg^2) [(9*10^-31 kg)(1.7 * 10^-27 kg) / (1m^2)]

adding the exponents: (-11)+(-31)+(-27) =-69

(-6.7 Nm^2/ kg^2 * 9 kg * 1.7 kg) / (1m^2) = 120 N

Combine: 1.20 * 10^-67 N

The electrical force between them would be equal to

F_e= (9*10^9 N m^2/C^2) [(1.6 *10^-19 C *2)/ (1m^2)]

Again, adding the exponents: 9+(-19)+(-19) = -29

(9 N m^2/C^2)(1.6 C)(1.6 C)(1m^2)= 9(5/2)= 23 N

Combine: 2.3 * 10^-28 N

Ratio: (2.3 * 10^-28 N)/ (1.20 * 10^-67 N) = **2 * 10^39 N**