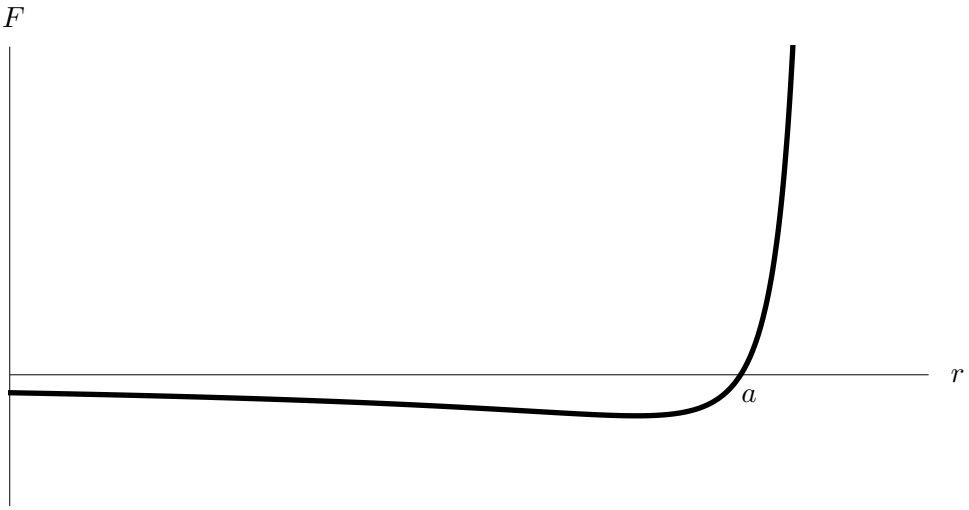
2. [6 points] The force, F, between two magnets arranged in an array depends on the distance r separating them. Looking at the graph below, a positive F represents a repulsive force; a negative F represents an attractive force. The horizontal intercept of the graph is $r = a$.



a. [1 point] What happens to the force if the magnets start with $r = a$ and are pulled slightly farther apart?

Solution: The force increases (or: the magnets repel each other, the force becomes more repulsive, the force becomes more positive...).

b. [1 point] What happens to the force if the magnets start with $r = a$ and are pushed slightly closer together?

Solution: The force decreases (or: the magnets attract each other, the force becomes more attractive, the force becomes more negative...).

c. [4 points] The magnets are said to be in *stable equilibrium* if the force between them is zero and the magnets tend to return to the equilibrium after a minor disturbance. Does $r = a$ represent a stable equilibrium? Give a brief explanation.

Solution: They are not in stable equilibrium. It's true that the force between them is 0 when $r = a$, but if they are pulled slightly apart, they will tend to move still farther apart, and if they are pushed closer together, they will tend to move still closer together.