8. [10 points] The Richter scale is a function r that takes as input the amount of energy E (in kJ) released in an earthquake, and outputs a number. The function r can be given by the formula

$$r(E) = \frac{2}{3} \log \left(\frac{E}{E_0} \right).$$

a. [5 points] An earthquake that releases $63,000$ kJ of energy is assigned the number 2 by the Richter scale. What is the value of E_0? Find your answer algebraically. Show all your work.

E_0=_____.

b. [5 points] Let E_A and E_B be the energy (in kJ) released during Earthquake A and Earthquake B respectively. Suppose that the amount of energy released during Earthquake A was 1000 times the amount of energy released during Earthquake B. What is $r(E_A) - r(E_B)$? Simplify as much as possible. Your answer should not involve any of the constants E_A or E_B.

$r(E_A) - r(E_B)$=_____.