

2. The Richter Scale provides a measure of the magnitude of an earthquake. One of the largest Richter numbers, M , ever recorded was 8.9 for an earthquake in Japan in 1933. The following formula shows a relationship between the amount of energy released and the Richter number:

$$M = \frac{2}{3} \log \frac{E}{0.007}$$

where E is measured in kilowatt-hours.

- a. How much energy was released in the 1933 Japanese earthquake? (1pt)
- b. If the average household uses 247 kWh/month, how many months would the energy released by an earthquake of this magnitude power 10million households? (1pt)
- c. Find the rate of change of earthquake magnitude with respect to energy when $E=70000$ kWh. (2pts)
- d. Explain what happens to the rate of change of magnitude as E increases. (1pt)