5. [7 points] Another one of Kiki's time machines called Machine2 can send a 1kg notebook $y = r(E) = 2\log(E) - 3$ years into the past or future when it consumes E megawatt-hours (MWh) of energy.

a. [3 points] How much energy is required for the Machine2 to send a 1 kg notebook 5 years into the future? Be sure to show your work and give your answer in **exact** form with units.

_____10000 MWh_____ of energy is required.

Solution: We need to fine E when $y = 5$, so we set $5 = 2\log(E) - 3$. Then $4 = \log(E)$ which means $E = 10^4$.

b. [4 points] Kiki has noticed that if she triples the energy input of Machine2, the number of years a 1 kg notebook travels in time increases by a fixed amount (that is not dependent on E). Find the amount of increase of $r(E)$ when E is tripled. Give your answer in **exact** form. Only solutions that show the amount of increase is not dependent on E will receive full credit.

$r(E)$ increases by _____$2\log(3)$_____ when E is tripled.

Solution: We subtract $r(3E) - r(E) = 2\log(3E) - 3 - (2\log(E) - 3) = 2\log(3)$.

