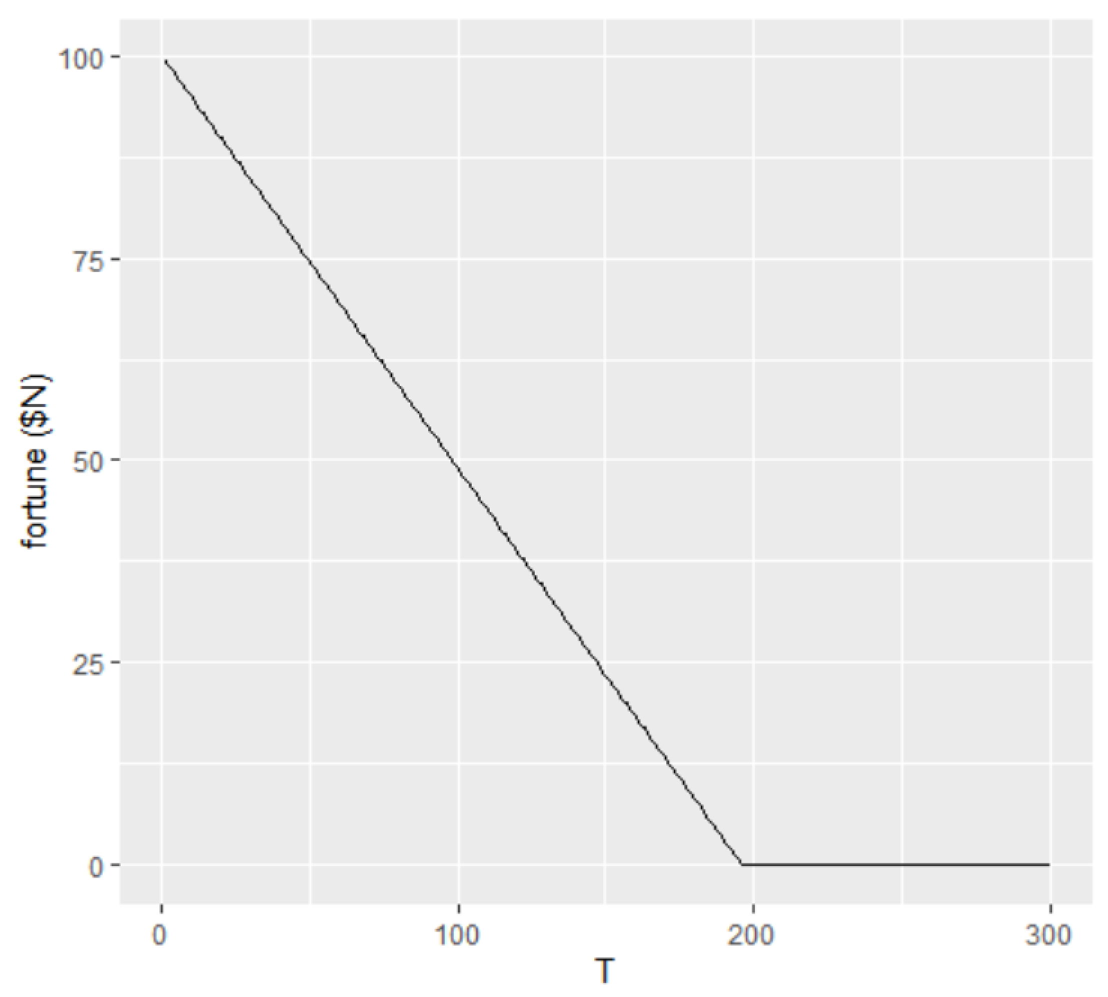
Report for Q3 and Q4

Q3

Q3(1)

The probability that he do not run ot of money after 100,1,000,10,000 , and 100,000 times are 1, 6.52956269890831e-170, 0, 0 respectively.
(Some number are too small to be stored as floating number, so some results are rounded to 1 or 0)

Q3(2)



My observation: The more he gamble, the less money he will have on average.(i.e. the money he have is a decreasing liner function to the gamble times *T* until he run out of money)

Q4

Q4(1)

x denotes age, y denotes height.

$$\bar{x} = \frac{\sum_{i=1}^{N} x_i}{N} = 4.923572$$

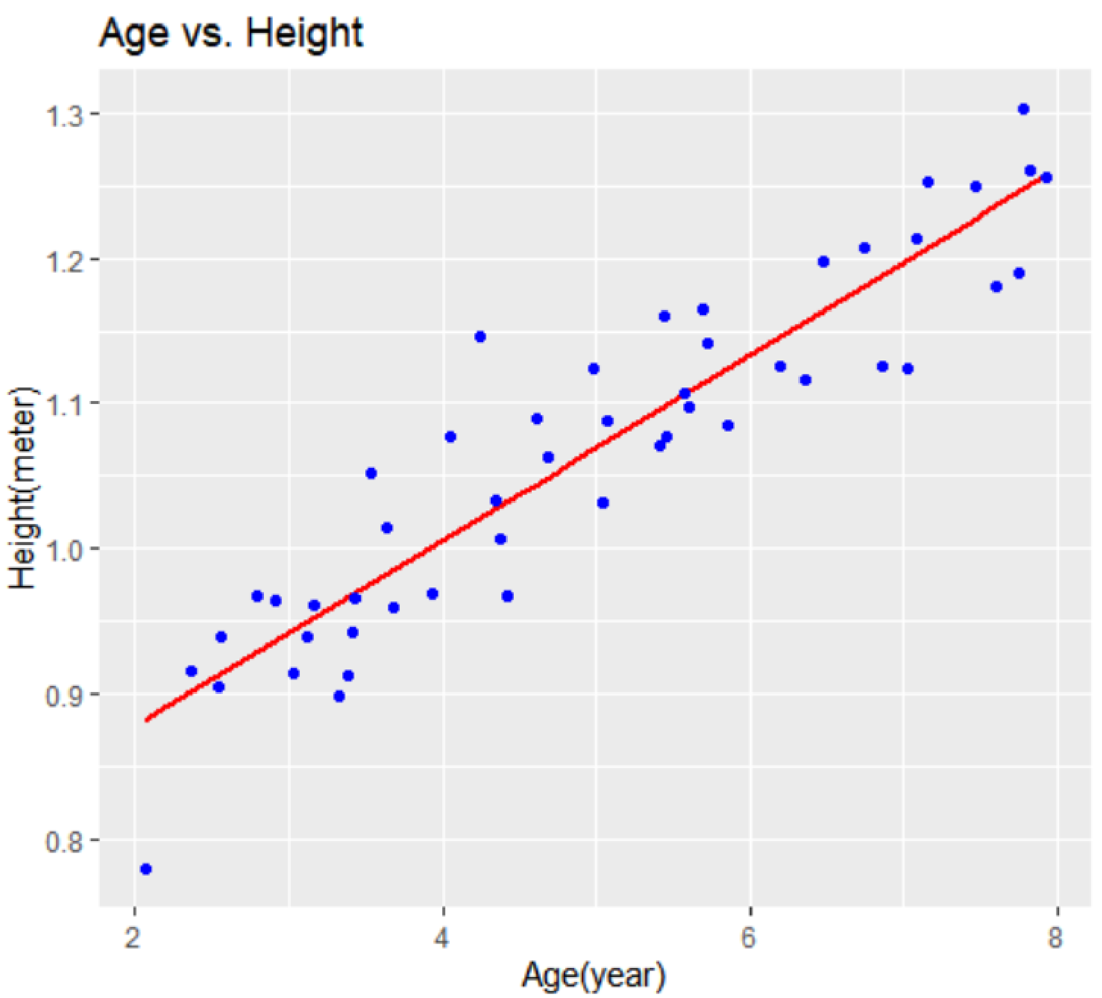
$$\bar{y} = \frac{\sum_{i=1}^{N} y_i}{N} = 1.064686$$

$$\widehat{\beta_1} = \frac{s_{xy}}{s_{xx}} = \frac{\sum_{i=1}^{N}(x_i - \bar{x})(y_i - \bar{y})}{\sum_{i=1}^{N}(x_i - \bar{x})^2} = \frac{0.1906353}{2.984218} = 0.06388116$$

$$\widehat{\beta_0} = \bar{y} - \widehat{\beta_1}\bar{x} = 1.064686 - 4.923572 * 0.06388116 = 0.7501625$$

So, applying the least square algorithm, the regression line is $y = 0.06388116x + 0.7501625$

Q4(2)



Q4(3)

the model we get in Q4(2) is $y = 0.75016 + 0.06388x$.
So, for a 3.5-yr-old boy, his expected height is $0.75016 + 0.06388 * 3.5 = 0.97374$ meters
and for an 8-yr-old boy, it's $0.75016 + 0.06388 * 8 = 1.2612$ meters