This table gives the projected life expectancy (life span) of a person born in the United States for select birth years from 1920 and through 2018[1].

1. Using technology, perform regression to find a logarithmic function $f(t) = a + b\ln(t)$ that models the data, with t equal to 0 in 1900.

2. Using technology, perform regression to find a power model $g(t) = a \cdot t^b$ that models the data, with t equal to 0 in 1900.

3. Using technology, plot the graphs of each of these functions along with the data on the same set of axis and decide which model fits the data best. On your plot make sure the domain of t matches up with the years 1920–2030.

4. Between these two models, which one predicts life expectancy will increase *more* in the future? I.e. which of these models is more optimistic?

5. What does the model that you decided fits the data best predict your own life expectancy to be?

6. What does the model that you decided fits the data best predict the life expectancy of a baby born today to be?

7. What year does the logarithmic model predict life expectancy to be 80 years old?

8. In the years since 2018, life expectancy in the US has started to decline[2]. This is suspected to be due to the COVID-19 pandemic. Someone born in the US in 2019, 2020, and 2021 has a life expectancy of 79 years, 77 years, and 76.1 years respectively. Add this new data to the data set.

   Both logarithmic and power functions are increasing functions. Since life expectancy is decreasing in recent years though, these functions may no longer provide the most accurate models. What's a type of function that more accurately models data that initially increases, but then begins to decrease? Using technology, perform regression to find such function $h(t)$ that models the data, again with t equal to 0 in 1900.

9. What does this new model predict the life expectancy of a baby born today to be? How does this compare to the figure predicted by either your logarithmic or power model?

Year	Life Span
1920	54.1
1925	60.6
1930	59.7
1935	63.9
1940	62.9
1945	65.9
1950	68.2
1955	69.6
1960	69.7
1965	70.2
1970	70.8
1975	72.6
1980	73.7
1985	74.7
1990	75.4
1992	75.8
1994	75.7
1996	76.1
1998	76.7
2000	76.8
2002	77.0
2004	77.5
2006	77.8
2008	78.2
2010	78.7
2011	78.7
2012	78.8
2013	78.8
2014	78.9
2015	78.7
2016	78.7
2017	78.6
2018	78.7

[1] cdc.gov/nchs/data-visualization/mortality-trends
[2] npr.org/sections/health-shots/2022/08/31/1120192583