Name: _____ Date: _____

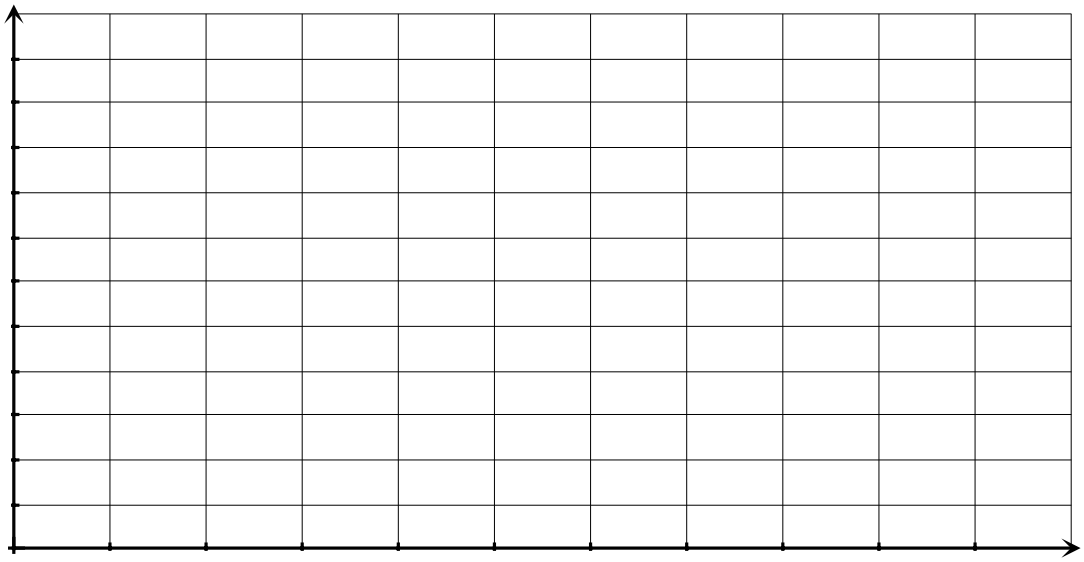
Social Security Trust Fund

The U.S. government has a trust fund in which money is saved to pay social security benefits to people when they reach retirement age. In 2012 the Social Security Administration reported how much money is expected to be in the fund over the next 20 years. Their estimates are shown in this table. (Source: 2012 Annual Report of Social Security Board of Trustees, p. 204)

Calendar Year	Years Since 2012	Amount in fund (in trillion $)
2012	0	2.78
2014	2	2.71
2016	4	2.68
2018	6	2.64
2020	8	2.54
2022	10	2.31
2024	12	2.03
2026	14	1.69
2028	16	1.27
2030	18	0.74

1. What is happening to the amount in the trust fund over time? Is it increasing or decreasing?

2. Make a graph with years since 2012 on the horizontal axis and the amount in the trust fund on the vertical axis. Scale the axes appropriately.



3. From your graph do these data appear to fit a linear or quadratic function? Explain.

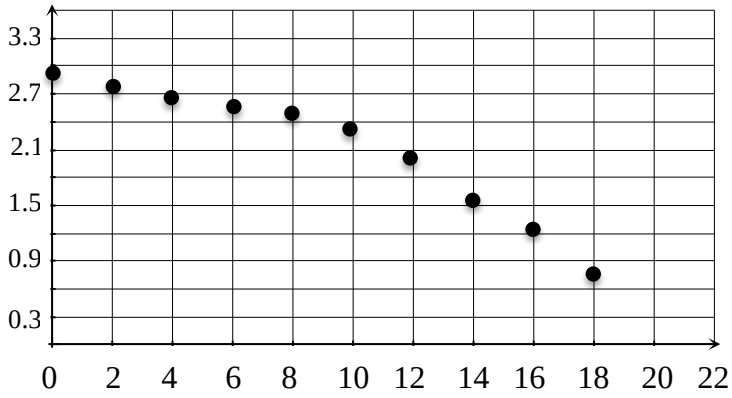
4. Draw a line or curve of best fit for these data points.

5a. Fill in the column for first differences. What pattern do you notice?

Calendar Year	**Years Since 2012**	**Amount in fund (in trillion $)**	**First Differences (Δy)**	**Second Differences $\Delta(\Delta y)$**
2012	0	2.78	---	---
2014	2	2.71	$2.71 - 2.78 = -0.07$	---
2016	4	2.68	$2.68 - 2.71 =$	
2018	6	2.64	$2.64 - 2.68 = -0.04$	
2020	8	2.54	$2.54 - 2.64 = -0.1$	
2022	10	2.31	$2.31 - 2.54 = -0.23$	
2024	12	2.03	$2.03 - 2.31 = -0.28$	
2026	14	1.69	$1.69 - 2.03 = -0.34$	
2028	16	1.27	$1.27 - 1.69 = -0.42$	
2030	18	0.74	$0.74 - 1.27 = -0.53$	

5b. Fill in the column for second differences. A quadratic function is a perfect fit if the second differences are the same. Is a quadratic function a perfect fit for these data?

6. If Jeremy is turning 65 in 2070 and the current trend continues in the Social Security fund, what can Jeremy predict will be in the fund when he turns 65?

Social Security Trust Fund	Rubric	
The core elements of performance required by this task are: • understand the different between linear and non-linear functions Based on these, credit for specific aspects of performance should be assigned as follows	points	section points
1. Gives correct answer: **Decreasing**	1	1
2. Gives correct answer:  **Axes scaled correctly** **Points plotted correctly**	1 1	2
3 Gives correct answer: **quadratic**	1	1
4. Gives correct answer: **a correct curve is drawn**	1	1
5. Gives correct answer: a.	1	

First Differences (Δy)

2.71 – 2.78 = –0.07
2.68 – 2.71 = –0.03
2.64 – 2.68 = –0.04
2.54 – 2.64 = –0.1
2.31 – 2.54 = –0.23
2.03 – 2.31 = –0.28
1.69 – 2.03 = –0.34
1.27 – 1.69 = –0.42
0.74 – 1.27 = –0.53

b. Gives correct answer: **A quadratic function is not a perfect fit.**	1	2

6. Gives correct answer such as: **A value between -20 and -15**	1	1
Total Points		**8**