A. Exploration 1 – Number Patterns

EX 1. Given the pattern …..2,4,8,14,22,32,44, …..

(a) How do you know the pattern is NOT linear?

(b) How do you know the pattern is NOT exponential?

(c) What are the next three terms of the sequence?

(d) What are the 3 terms that came before 2?

EX 2. Given the pattern …..16,15,12,7,0,-9,-20 …..

(a) How do you know the pattern is NOT linear?

(b) How do you know the pattern is NOT exponential?

(c) What are the next three terms of the sequence?

(d) What are the 3 terms that came before 16?

EX 3. Data Sets in Context:

Below is a data set that measures the Profit, P(C), in Millions of Euros as a function of Cars, C, that are produced per year.

C	0	1	2	3	4	5	6	7	8	9	10	11
P(C)	-40	-18	0	14	24	30	32	30	24	14	0	-18

(a) Describe the pattern in the data set

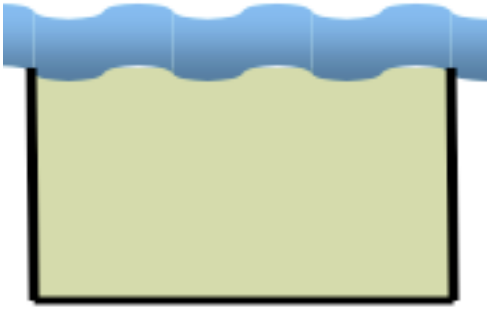
(b) What are the next three terms of the sequence?

(c) What are the 3 terms that came before 0?

SUMMARY: KEY TO DATA ANALYSIS:

B. Geometry Problems – Maximum Area

A farmer has 400 m of fencing. He wants to enclose 2 rectangular garden plots that border on a river and that are separated by a fence. If the farmer does NOT fence the side along the river, what is the largest area he can enclose? What are the dimensions (length and width) of this enclosure?



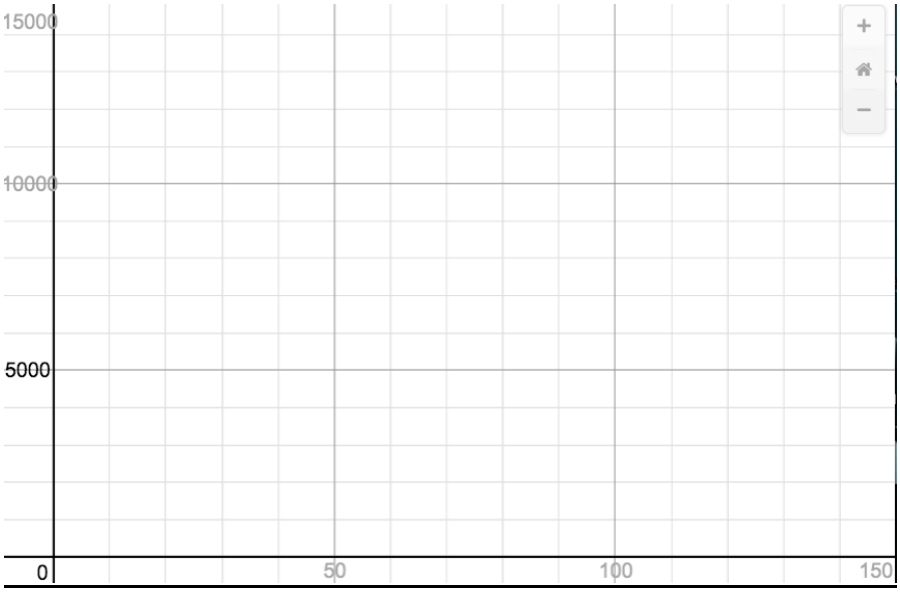
Data

Explore the different combinations of widths & lengths he could have for his garden. Calculate the area for each (2 starting examples for W are given)

W	20	40					
L							
A							

Problem: If the farmer wanted to *maximize* the area of his gardens, what would he choose for the dimensions of EACH garden? Explain your choice.

Graph:



What does the solution look like on your graph?

Algebra - Could we write an equation for the area ***A*** in terms of the width, ***w***?

A. Exploration #3

The Paymore Shoe company introduced a new line of neon green high heel running shoes. The table below shows the number of pairs of shoes sold at one store over an 11 month period.

Month	1	2	3	4	5	6	7	8	9	10	11
Shoes sold	56	60	62	62	60	56	50	42	32	20	6

(a) Show that the data is quadratic

(b) State the domain and range for this model, given the context for the data.

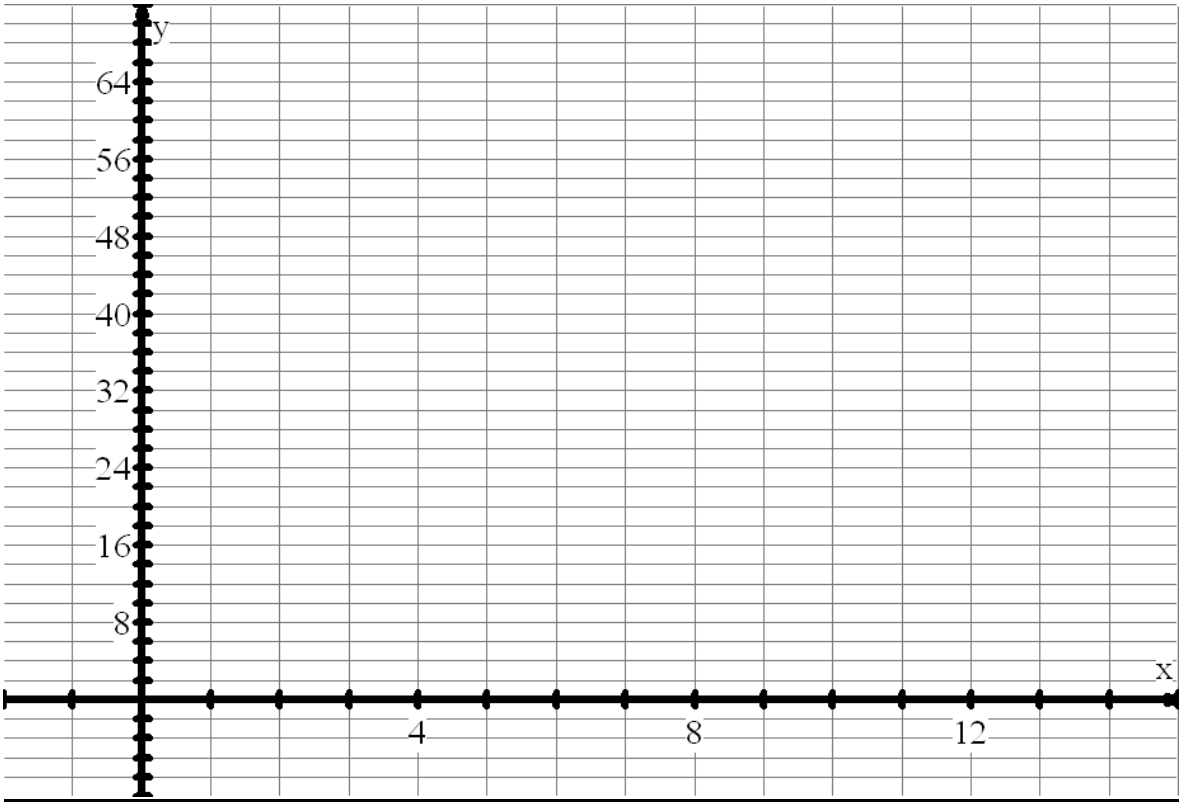
(c) At what rate are shoe sales changing between months 1 & 2? What does this mean?

(d) At what rate are shoe sales changing between months 6 & 7? What does this mean?

(e) Explain why a quadratic model would be suitable for the fashion business.

(f) Explain why a quadratic model would NOT be suitable for the fashion business.

(g) Draw a scatter-plot of the data.



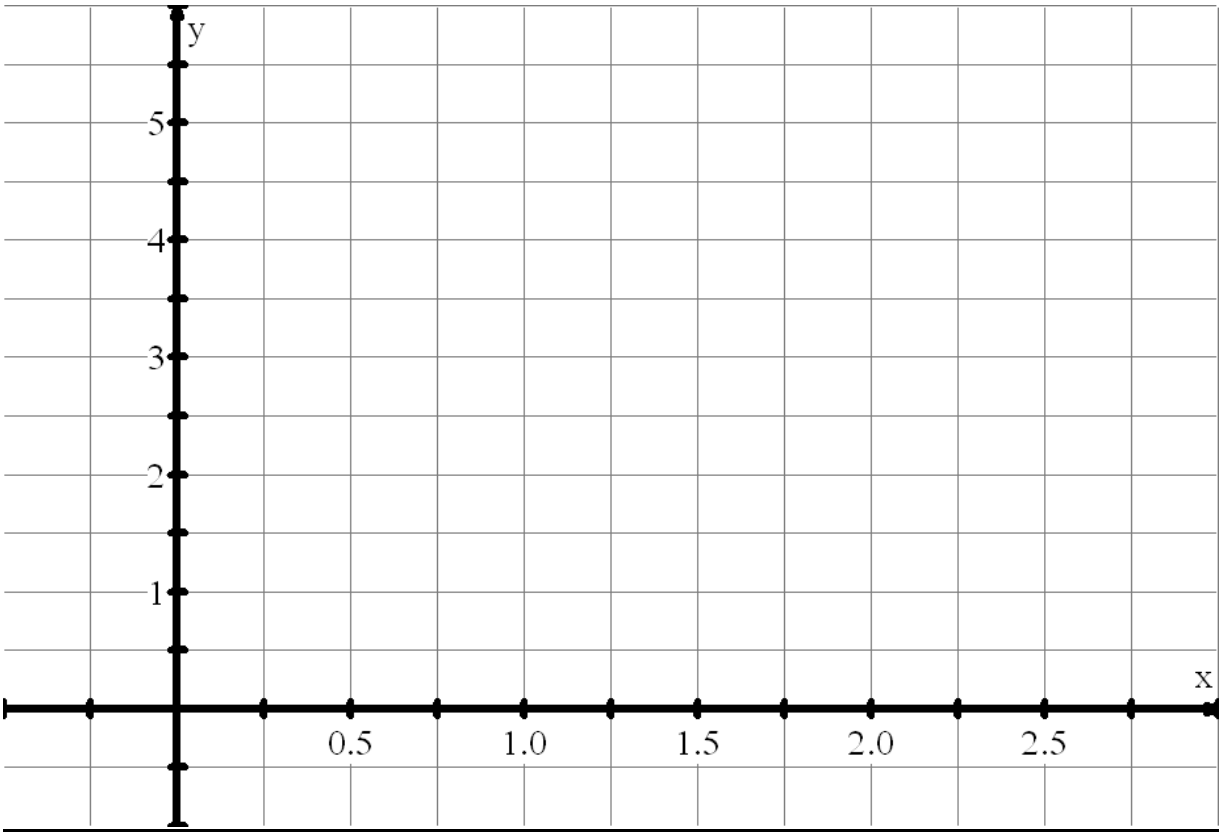
B. Exploration #4

12. A ball is tossed straight up in the air. Its height is recorded every quarter second.

Time (s)	0	0.25	0.50	0.75	1.00	1.25	1.50	1.75	2.00
Height (m)	1.5	3.5	4.9	5.7	5.7	5.2	4.1	2.4	0.1

(a) Draw a scatter plot.
(b) What type of model is a reasonable representation of the relationship between the height of the ball and the time in the air? Explain
(c) Draw the graph that best fits the data.
(d) When does the ball reach its highest point above the ground? What is the ball's height at this point? Be as precise as you can, using your graphical model.
(e) About how long is the ball in the air? Explain.

C.



Exploration #5

Mr Santowski & Mr Smith are on the roof of an apartment building and Mr S kicks a soccer ball. The height of the soccer ball is, H, measured in meters above the ground and the time of flight of the ball is measured in seconds and the flight of the ball can be modeled by the equation $H = -5t^2 + 30t + 80$. You will analyze the trajectory of the ball by answering the following questions.

(A) Graph the relation on the calculator and use the data table on the GDC to complete the data table on this sheet and then graph the data points to make a diagram here.

(B) How high was the building from which we kicked the ball?

(C) How long did it take for the ball to reach its maximum height? What was its maximum height?

(D) When did the ball hit the ground?

(E) For how long was the ball in flight?

(F) What is the domain for this relation, given the context of the equation?

(G) What is the range?

(H) What is the height of the ball at t = 5.5 seconds?

(I) At what time(s) is the height of the ball 100 m?