

# Spaghetti Palace

## In-Class Review

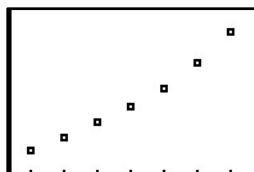
The total sales  $S$  (in millions of dollars) for the Spaghetti Palace for the years 1999 to 2005 are shown in the table.

Year	1999	2000	2001	2002	2003	2004	2005
Sales ( $S$ )	347	438	539	652	774	969	1178

L1	L2	L3
9	347	
10	438	
11	539	
12	652	
13	774	
14	969	
15	1178	

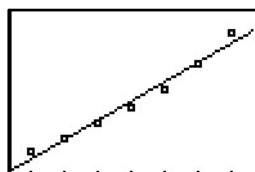
Data into lists.

- Use a graphing calculator to create a scatter plot of the data. Let  $t$  represent the year with  $t = 9$  corresponding to 1999. Sketch the graph.

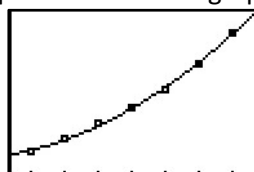


A scatter plot shows the relationship between the year and sales.

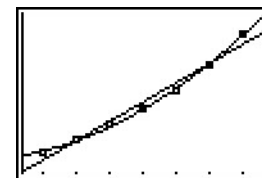
- Use the regression feature to find a linear model and a quadratic model for the data. Graph both models along with the scatter plot. Sketch each graph.



Linear Regression



Quadratic Regression



Linear and Quadratic Regression

- Which model is better? Justify your answer.

```
LinReg
y=ax+b
a=135.3571429
b=-924.7142857
r^2=.9719700513
r=.9858854149
```

```
QuadReg
y=ax^2+bx+c
a=12.833333333
b=-172.6428571
c=871.952381
R^2=.9981814822
```

$r^2$  = coefficient of determination  
It tells us the relative predictive power of a model. The closer  $r^2$  is to 1, the better your prediction.

$r^2$  for the quadratic regression is closer to 1, therefore this is a better predictor.

- Use the better model to predict total sales in the year 2010. How did you find it?

X	Y <sub>2</sub>
16	1395
17	1645.9
18	1922.4
19	2224.6
20	2552.4
21	2906
22	3285.1

X=20

Quadratic Equation Table

The year 2010 is 20 in the year (x) table.

The prediction for 2010 is sales will be 2552.4 million.