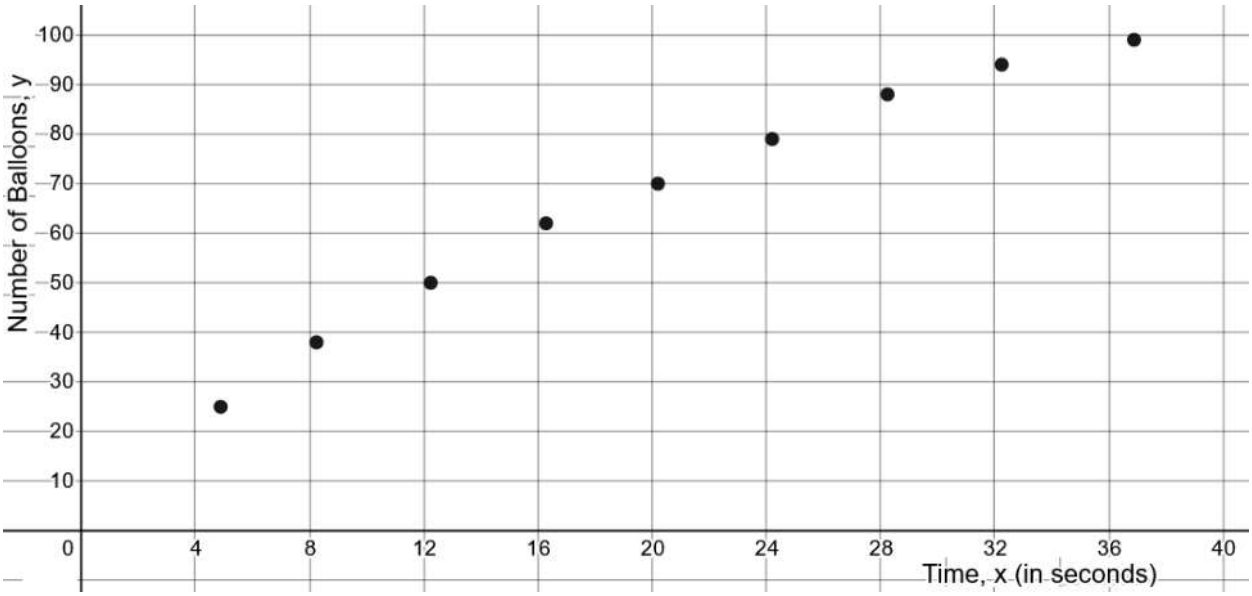
The Balloon Popping Dog

1) Table of data

Time in seconds (x)	Number of Balloons (y)
4.88	25
8.24	38
12.24	50
16.28	62
20.20	70
24.20	79
28.24	88
32.24	94
36.88	99

2) Scatter plot



3) The table below shows the value of the R^2 for the different models

Model	R^2
linear	0.9754
logarithm	0.9821
exponential	0.8928
power regression	0.9937

We choose the logarithmic model since the graph looks like a logarithmic function. In addition, the R^2 for the logarithmic model is very high (R^2 = 0.9821).

According to the calculator, the best logarithmic function that best fits the data is

y = 37.837 ln(x) – 40.414 where x = time in seconds and y = number of balloons pop by the Twinkie

4) Prediction

The table below shows the predicted number of balloons Twinkie can pop in 1 minute, 5 minutes, and 10 minutes, respectively using the equation y = 37.837 ln(x) – 40.414 where x = time in seconds and y = number of balloons pop by the Twinkie.

Time in seconds, x	predicted number of balloons, y
60	115
300	175
600	202

5) Solve for x in y = 37.837 ln(x) – 40.414

We have ln (x) = y + 40.414 or x = $e^{(y+40.414)/37.837}$

Number of balloons, y	Predicted time in seconds, x
500	1595481.707
5000	too big
50000	too big

6) We can only use the model to predict the number of balloons pop for times that are less than 60 seconds. Predicting for times greater than 1 minute is an extrapolation and can give misleading results. We are confident that the model y = 37.837 ln(x) – 40.414 can give reasonable results if x is within 60 seconds.