

Name: _____

Key

Date: _____

Exponential and Quadratic Regression

Ex 1: A rapidly growing bacterium has been discovered. The data in the following chart represents the number of bacteria in a sample each hour.

Hours	Bacteria Present
0	20
1	40
2	75
3	150
4	297
5	510

- a) Write the linear model that represents the data and the correlation coefficient.

$$y = 94.17x - 53.43 \quad r^2 = .8637$$

- b) Write the exponential model that represents the data and the correlation coefficient.

$$y = 20.51(1.92)^x \quad r^2 = .9989$$

- c) Which model is the best fitting model? Explain.

Exponential. r^2 is closer to 1.

- d) Using the best fitting model, how much bacteria is present after 10 hours?

$$f(10) = 14,245.42$$

- e) Using the best fitting model, how much bacteria is present after one day?

$$f(24) = 135,520,033.1$$

Ex 2: Amery recorded the distance and height of a basketball when shooting a free throw.

- a) Find the quadratic equation for the relationship of the horizontal distance and the height of the ball.

Round to 3 decimal places.

$$y = -0.118x^2 + 2.112x + 4.215$$

$$y = -0.12x^2 + 2.11x + 4.21$$

- b) Using this function what is the approximate maximum height of the ball?

$$\frac{-b}{2a} \text{ or } \text{poly-solv} \leftarrow \text{recommended}$$

$$13.68 \text{ ft.}$$

$$(\text{at } 8.96 \text{ seconds})$$

Distance (feet) x	Height (feet) f(x)
0	4
2	8.4
6	12.1
9	14.2
12	13.2
13	10.5
15	9.8