

S.ID.B.6: Regression 6

- 1 The table below gives the relationship between x and y .

x	1	2	3	4	5
y	4.2	33.5	113.1	268.1	523.6

Use exponential regression to find an equation for y as a function of x , rounding all values to the *nearest hundredth*. Using this equation, predict the value of x if y is 426.21, rounding to the *nearest tenth*. [Only an algebraic solution can receive full credit.]

- 2 Using a microscope, a researcher observed and recorded the number of bacteria spores on a large sample of uniformly sized pieces of meat kept at room temperature. A summary of the data she recorded is shown in the table below.

Hours (x)	Average Number of Spores (y)
0	4
0.5	10
1	15
2	60
3	260
4	1130
6	16,380

Using these data, write an exponential regression equation, rounding all values to the *nearest thousandth*. The researcher knows that people are likely to suffer from food-borne illness if the number of spores exceeds 100. Using the exponential regression equation, determine the maximum amount of time, to the *nearest quarter hour*, that the meat can be kept at room temperature safely.

S.ID.B.6: Regression 6
Answer Section

1 ANS:

$$y = 2.19(3.23)^x \quad 426.21 = 2.19(3.23)^x$$

$$\frac{426.21}{2.19} = (3.23)^x$$

$$\log \frac{426.21}{2.19} = x \log(3.23)$$

$$\frac{\log \frac{426.21}{2.19}}{\log(3.23)} = x$$

$$x \approx 4.5$$

REF: 011637a2

2 ANS:

$$y = 4.168(3.981)^x \quad 100 = 4.168(3.981)^x$$

$$\log \frac{100}{4.168} = \log(3.981)^x$$

$$\log \frac{100}{4.168} = x \log(3.981)$$

$$\frac{\log \frac{100}{4.168}}{\log(3.981)} = x$$

$$x \approx 2.25$$

REF: 081736aii