# Survivor from the Spread of the Disease

**Purpose**

* Determine a function that fits a set of real-world data.

**Situation**

You are on a deserted island, and you are exposed to a rare disease by the people on the island with you. Only one of you on the island will survive this disease because of the immunity that is already in his or her system. Which one of you will survive?

**Materials**

* six-sided die
* graphing calculator

**Data Collection Procedures**

1. To stimulate the spread of the disease, roll a die.
2. If you roll a 1 through 5, you escape the rare disease. If you roll a 6, you become infected and die from the rare disease.
3. Record the number of people who did not become infected with the rare disease on the table below.
4. Repeat steps 1 through 3 with those people who are still “living”. Once you are dead, you cannot roll the die again.

|  |  |
| --- | --- |
| Exposure | **Number of People who are Still “Living”** |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 | ezyancrk[1] |
| 12 |  |

**Data Analysis Procedures**

Graph the data as a scatterplot on the grid below. “Exposures” will be the *x*, and “Number of People who are still living” will be the y. Make sure you label the axes and the scales on the graph.

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**Questions**

1. What algebraic model (linear, quadratic, cubic, or exponential) appears to fit the data?

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1. Using the graphing calculator, write a function to fit the model.

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1. What value was given for *a*? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does this value represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. What value was given for *b*? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. What does this value represent? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
5. Based on your model, on fifth day of exposure, how many people were still alive? Show your work. Circle your final answer.
6. How does the above answer compare to your actual data? Explain any differences.
7. What is the probability of becoming infected with the rare disease at each exposure?

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1. Subtract this probability from 1. How does this theoretical number compare to your *b* value in your experimental model?
2. If you continue to live, are you these compound events dependent or independent? Explain your rationale.
3. What is the probability that you will live after the first exposure but become infected and died after the second exposure? Show your work.
4. In your opinion, should this rare disease be considered highly contagious? Explain your answer using your responses and calculations from questions 9 – 12.