Exponential Functions

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1 Exponential Patterns

- Not all growth or decay models are linear.
- Consider the following pattern

x	y
1	10
2	11
3	12.1
4	13.31
5	14.641

- Is this pattern linear?
- How can we characterize this pattern?

2 Formulae for Exponential Pattern

- A pattern is exponential if the response variable increases by the same rate each time the explanatory variable increases by 1.
- Recursive Formula:
$$P_n = (1 + r)P_{n-1}$$
- Explicit Formula:
$$P_n = (1 + r)^n P_0$$
- In both of the above, r is a percent written as a decimal.
- What is the recursive formula for the pattern in the previous section?
- What is the explicit formula for the pattern in the previous section?
- Graph this pattern. What is its shape like?

3 Sample Problems

1. The current population of box turtles in the Maryville College Woods is approximately 300 turtles. Assuming that the population increases by 5% every year, create a chart showing the turtle population over the next 10 years.

2. Draw a graph of the turtle population.

3. Amoeba are single celled organisms which reproduce by mitosis. An amoeba undergoes mitosis every 30 minutes. That is, it divides into two amoeba. If you have a culture that contains 100 Amoeba, how many will it contain in 24 hours (assuming none die)?