Logarithmic Regression

**Answer the following questions about the given tables. Have a calculator ready to do regressions.**

1. a. The following is a table of the population of Milwaukee. Enter the data into your calculator and graph it.

|  |  |
| --- | --- |
| Year | Population |
| 1970 | 717,372 |
| 1980 | 636,297 |
| 1990 | 628,088 |
| 2000 | 596,974 |

 b. Which regression would make most sense? Why?

 Exponential / Linear/ Logarithmic

 c. What is your regression equation?

 d. Using your equation, what will the population be in 2015?

 e. According to your equation, when will the population be 500,000?

2. a. The following is a table of the temperature of a cup of hot coffee after $t$ minutes.

 b. Which regression would make most sense? Why?

|  |  |
| --- | --- |
| Time (min) | Temp $(°C)$ |
| 2 | 64.8 |
| 5 | 49.0 |
| 10 | 31.4 |
| 15 | 22.0 |
| 20 | 16.5 |
| 25 | 14.2 |
| 30 | 12.0 |

 Exponential / Linear/ Logarithmic

 c. What is your regression equation?

 d. Using your equation, what was the initial temperature?

 e. According to your equation, when will the temperature be $10^{°}C$?

3. a. The following is a table of the distance traveled by a Grey-cheeked Thrush during its migration starting on April 25th in Louisiana.

|  |  |
| --- | --- |
| Number of days | Distance traveled (miles) |
| 3 | 395 |
| 7 | 902 |
| 10 | 1298 |
| 15 | 2001 |
| 19 | 2485 |
| 21 | 2724 |
| 23 | 3004 |

 b. Which regression would make most sense? Why?

 Exponential / Linear/ Logarithmic

 c. What is your regression equation?

 d. According to your regression equation, how far away from Louisiana would the bird be after 17 days?

 e. The bird’s final destination is Alaska, some 4000 miles away from where they began their journey. When can we expect the birds to get there?

4. a. The following is a table of the distance traveled by a rocket car and a normal car that are racing. The normal car was already traveling when it started, but began to slow down after its wheel fell off. The rocket car started from a complete stop, but gets pretty fast. Create regression equations for the distance of both cars after $t$ seconds.

|  |  |  |
| --- | --- | --- |
| Time (sec) | Dist trav by car | Dist trav by rocket |
| 2 | 14 | 3 |
| 5 | 32 | 7 |
| 10 | 46 | 58 |
| 13 | 54 | 190 |
| 16 | 56 | 649 |

 b. Equation of Car:

 c. Equation of Rocket:

 d. When will the rocket and car have traveled the same distance?

 e. On what interval of time has the car traveled further?

 f. On what interval of time has the rocket traveled further?