

# Day 01 Modeling Real Life Data Homework

Name \_\_\_\_\_

Date \_\_\_\_\_ Block \_\_\_\_\_

1. The data at the right shows the cooling temperatures of a freshly brewed cup of coffee after it is poured from the brewing pot into a serving cup. The brewing pot temperature is approximately 180° F.

Time (mins)	Temp (° F)
0	179.5
5	168.7
8	158.1
11	149.2
15	141.7
18	134.6
22	125.4
25	123.5
30	116.3
34	113.2
38	109.1
42	105.7
45	102.2
50	100.5

- a. Determine the regression model to represent this data.
- b. Is this data a good fit to represent this data? Why?
- c. Based upon the new equation, what was the initial temperature of the coffee?
- d. When is the coffee at a temperature of 106 degrees?
- e. What is the predicted temperature of the coffee after 1 hour?

2. As shown in the given table of data, the population of a small town was 2,000 in the year 1950. Answer the questions below based on your data.

Year (1950 = 0)	Population
0	2000
5	2980
10	4450
20	9900
30	22,000
40	50,000

- a. Determine the regression model to represent this data.
- b. Is this data a good fit to represent this data? Why?
- c. What would the population be in 2000? In 2019?
- d. When would the population be 70,000?

3. The given table represents the population growth in another town. Answer the following questions.

Year	Population
1	2000
5	4200
10	6500
20	8800
30	10500
40	12500

- a. Determine the regression model to represent this data.
- b. Is this data a good fit to represent this data? Why?
- c. What would the population be in the 55<sup>th</sup> year?
- d. When would the population be 15,000?

4. The table at the right shows the horizontal distance (in feet) traveled by a baseball hit at various angles. The initial speed of the ball at the bat is constant. Express answers to 3 decimal places unless told otherwise.

Angle (degrees)	Distance (feet)
10°	115.6
15°	157.2
20°	189.2
24°	220.8
30°	253.8
34°	269.2
40°	284.8
45°	285.0
48°	277.4
50°	269.2
58°	244.2
60°	231.4
64°	180.4

- Determine the regression model to represent this data.
- Is this data a good fit to represent this data? Why?
- What distance will correspond to an angle of 5°?
- What angle(s) will correspond to a distance of 2780, to the nearest degree?
- The first baseman is positioned 100 feet from home plate and the right fielder is positioned 180 feet from home plate. The batter wants to hit the ball half way between these players. What angle, to the *nearest degree*, should be used to accomplish this hit?
- The left field fence is 280 feet from home plate. At what angle, or angles, to the nearest degree, should be used to accomplish this hit?

5. A pharmaceutical company is testing a drug. To find the mathematical model, a dose of 1000 mg is absorbed by a person's bloodstream and blood samples are taken every five hours in order to calculate the amount of drug that remains in the body. Answer the following questions based on this data.

Drug Absorption Data	
Hours Since Drug was Administered	Amount of Drug in Body (mg)
0	1000
5	550
10	316
15	180
20	85
25	56
30	31

- Determine the regression model to represent this data.
- Is this data a good fit to represent this data? Why?
- How much of the drug is in the body after 7 hours?
- When will there be less than 10 mg of the drug left in the body?
- How much drug is left in the body after 40 hours?