Other Regressions

Name: _____

Date: _____ Period: ___

1. Given the following data table, use finite differences to determine the regression model below

x	f(x)	1st Difference	2nd Difference	3rd Difference	4th Difference	5th Difference
1	6.2					
2	19.2					
3	54.2					
4	128					
5	262.2					
6	483.2					
7	822.2					
8	1315.2					

2. Find the curve of best fit for the following set of data.

Years of Education	Income ($)
5	11,000
7	18,000
8	19,000
10	25,000
13	28,000
15	35,000
17	34,000
19	40,000
20	45,000
22	44,000
24	50,000

Based on the scatterplot, what model fits the data?

What is the regression equation?

How much should you make if you attend school for 30 years?

If someone makes $65,000 per year, how many years do you estimate that they were in school?

3. The fuel economy of a car will vary depending on the speed of the car.

Speed (miles per hour)	Fuel Economy (miles per gallon)
10	22
20	42
30	46
40	48
50	45
60	41
70	39
80	38

What regression model does this data follow?

What is the regression equation?

What is the fuel economy for a car traveling at 90 miles per hour?

4. At 1821 feet tall, the CN Tower in Toronto, Ontario, is the world's tallest self-supporting structure. [Note: This information is taken from College Algebra: A Graphing Approach by Larson, Hostetler, & Edwards (Third Edition), page 202.]

   Suppose you are standing in the observation deck on top of the tower and you drop a penny from there and watch it fall to the ground. The table at the right shows the penny's distance from the ground after various periods of time (in seconds) that have passed.

   What model fits the data?

   What is the regression equation?

   Where is the penny located after falling for a total of 10.5 seconds?

Time (seconds)	Distance (feet)
0	1821
2	1757
4	1565
6	1245
8	797
10	221

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5. The data below 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 180^0 F.

   When is the coffee at a temperature of 106 degrees?

   What is the predicted temperature after 1 hour?

   In 1992, a woman sued McDonald's for serving coffee at a temperature of 180° that caused her to be severely burned when the coffee spilled. An expert witness at the trial testified that liquids at 180° will cause a full thickness burn to human skill in two to seven seconds. It was stated that had the coffee been served at 155°, the liquid would have cooled and avoided the serious burns. The woman was awarded over 2.7 million dollars. As a result of this famous case, many restaurants now serve coffee at a temperature around 155°. How long should restaurants wait (after pouring the coffee from the pot) before serving coffee, to ensure the coffee is not hotter than 155°?

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

6. The data below show the average growth rates of 12 Weeping Higan cherry trees planted in Washington, DC. At the time of planting, the trees were one year old and were all 6 feet in height.

   What was the average height of the trees at one and one-half years of age? (to the nearest tenth of a foot)

   What is the predicted average height of the trees at 20 years of age?

   If the average height of the trees is 10 feet, what is the age of the trees to the nearest tenth of a year?

Age of Tree (in years)	Height (in feet)
1	6
2	9.5
3	13
4	15
5	16.5
6	17.5
7	18.5
8	19
9	19.5
10	19.7
11	19.8