

**Directions – Using your calculator, find the appropriate regression equation and correlation coefficient  $r$  and answer each set of questions for that problem. Record your answers in the chart.**

- 1.) Below are possible wages as provided by the local Restaurant Association for a server working at the Blue Point Café. In addition to a server's salary, he earns an average of \$3.50 in tips per table served.

Tables	10	15	20	25	30	35	40	45	50	55
Wages	75.00	92.50	110.00	127.50	145.00	162.50	180.00	197.50	215.00	232.50

- a.) Using a linear model, how much money did a server make if he served 22 tables?  
b.) Using a linear model, how many tables did a server serve if he made \$150?

- 2.) The table below gives the weight (in kilograms) and life spans (in years) of several species of mammals. A POWER model best fits this set of data.

Species	Cat	Dog	Chimp	Bear	Horse	Mouse	Hippo	Elephant
Weight (kg)	2.5	8.5	45	250	480	0.024	1400	2800
Lie Span	12	12	20	25	20	3	41	35

- a.) The average weight of a gorilla is 140 kg; what would you predict for the gorilla's lifespan?  
b.) A lion lives to be about 15 years old; what would you predict for the lion's weight?

- 3.) During the 19<sup>th</sup> century, rabbits were brought to Australia. Since rabbits had no natural enemies on that continent, their population increased exponentially. Suppose there were 65,000 rabbits in Australia in 1865 and 2,500,000 in 1867 where let  $x = 0$  for 1865.

- a.) When did the rabbit population hit 16 million?  
b.) Assuming this growth continued, what would the rabbit population be in 1870?

- 4.) The table below represents a linear model of the number of drinks consumed and the corresponding blood alcohol concentrations that are listed for various subjects with the same body weight.

Number of drinks	2	2	4	5	8
Blood alcohol concentration	0.05	0.06	0.11	0.13	0.22

- a.) What is the blood alcohol level for a person of the same weight who has consumed 6 drinks?  
b.) How many drinks would it take for an individual's blood alcohol concentration to reach 0.30?

- 5.) Due in large part to the ease of travel and increased use of telephones, email, and instant messaging, the number of post offices in the United States has been on the decline since the turn of the century. The data given show the number of post offices (in thousands) for selected years.

Year ( $t = 1901$ )	1	20	40	60	80	100
Post Offices (in thousands)	77	52	43	37	32	28

- a.) Using a logarithmic model, in what year did the number of post offices dropped below 34,000?  
b.) Using a logarithmic model, how many post offices will there be in the year 2015?

- 6.) The table below show different height of a launched rocket:

Time (in seconds)	0	0.5	1.5	2.5	3.5
Height (in feet)	0	25	58	58	25

- a.) Using a quadratic model, when does the rocket reach the ground?  
b.) Using a quadratic model, what is the maximum height of the rocket?

- 7.) The table below shows the closing prices for the NASDAQ Stock Index at the end of February for several years. This data set is EXPONENTIAL. Note: Use  $x = 0$  for 1992.

Year	1992	1993	1994	1995	1996	1997	1998	1999	2000
Closing Price	633	671	793	794	1100	1309	1771	2288	4696

- a.) When will the NASDAQ Stock Index will hit 10,000?  
b.) What will the NASDAQ's closing price be for February 2017?

- 8.) The table below gives the cost of information storage per petabyte. This data set is LOGARITHMIC.

Petabytes	6	9	12	21	45
Cost (\$)	2132.00	2575.00	2943.75	4362.50	6352.80

- a.) Using the regression equation, what is the cost of 50 petabytes of storage?  
b.) Using the regression equation, how many petabytes could you get for \$8,000?

- 9.) The accompanying table shows the enrollment of a preschool from 1980 through 2000. This data set has a linear relationship.

Year	1980	1985	1990	1995	2000
Enrollment	14	20	22	28	37

- a.) Using the regression equation, what is the enrollment of preschool for 2014?  
b.) Using the regression equation, when will the enrollment be 75?

- 10.) The table below shows the cooling temperatures of a freshly brewed cup of coffee after it is poured from a brewing pot into a serving cup. The brewing pot temperature is approximately 180°F.

Minutes	0	5	8	11	15	18	22	25	30	34	38	42	45	50
Temp.	179.5	168.7	158.1	149.2	141.7	134.6	125.4	123.5	116.3	113.2	109.1	105.7	102.2	100.5

- a.) Using an exponential model, what will the coffee's temperature be after 1.5 hours?  
b.) In 1992, a woman sued McDonald's for serving coffee at a temperature of 180°F because she severely burned herself when she spilled her coffee. It was determined by an expert that serving coffee at 155°F would avoid severe burns. The woman won her lawsuit and won \$ 2.7 million. As a result of this famous case, many restaurants serve coffee at the recommended temperature by the expert. Using an exponential model, how long will it take to ensure that the coffee is not hotter than the recommended temperature?