**Scatter Plots and Lines of Best Fit**

**Directions: Enter your data on your calculator in List 1 and List 2. Use the Linear Regression (linreg) feature on your calculator to calculate the line of best fit. Then answer the questions. Round all coefficients and constants to two decimal places.**

1) The table below displays data that relate the number or oil changes per year and the cost of engine repairs. You want to use this data to predict the cost of repairs from the number of oil changes.

|  |  |  |
| --- | --- | --- |
| Number of Oil Changes Per Year | Cost of Engine Repairs ($) | 1. Write the equation of the line of best fit using the linear regression feature on your calculator.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does the slope mean in the context of this data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. What does the y-intercept mean in the context of this data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. Use your linear regression equation to predict how much it will cost for engine repairs if you get your oil changed 8 times per year.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 3 | 300 |
| 5 | 300 |
| 2 | 500 |
| 3 | 400 |
| 1 | 700 |
| 4 | 400 |
| 6 | 100 |
| 4 | 250 |
| 3 | 450 |
| 2 | 650 |
| 0 | 600 |
| 10 | 0 |
| 7 | 150 |

2) Is it worth it to stay in school and earn a higher degree? Does more education mean more yearly earnings over your lifetime? Use the data below to answer the following questions.

|  |  |  |
| --- | --- | --- |
| Years of Schooling | Yearly Earnings (Thousands of Dollars) | 1. Write the equation of the line of best fit using the linear regression feature on your calculator.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does the slope mean in the context of this data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. If a student drops out of school during ninth grade year, how much money would you expect him/her to earn per year?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. Use your linear regression equation to predict how much money a high school graduate should expect to earn per year.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 10 | 15 |
| 11 | 19 |
| 13 | 20 |
| 14 | 21 |
| 15 | 25 |
| 16 | 32 |
| 17 | 33 |
| 18 | 37 |
| 20 | 45 |
| 21 | 53 |

3) In BMX dirt-bike racing, jumping high or “getting air” depends on many factors: the rider’s skill, the angle of the jump, and the weight of the bike. Here are data about the maximum height for various bike weights.

|  |  |  |
| --- | --- | --- |
| Weight (pounds) | Height (inches) | 1. Write the equation of the line of best fit using the linear regression feature on your calculator.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does the slope mean in the context of this data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. Is there a positive, negative, or no relationship between bike weight and jump height? Explain your answer.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. Use your line of best fit to predict the maximum height for a bike that weighs 21.5 pounds if all other factors are held constant.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 19 | 10.35 |
| 19.5 | 10.3 |
| 20 | 10.25 |
| 20.5 | 10.2 |
| 21 | 10.1 |
| 22 | 9.85 |
| 22.5 | 9.8 |
| 23 | 9.79 |
| 23.5 | 9.7 |
| 24 | 9.6 |
|  |  |

4) The EHS baseball team has been fundraising for months in order to buy new equipment. The expected cost of new the equipment is about $250. Use the information below from the team’s bank statement for the first 10 weeks of school to answer the following questions.

|  |  |  |
| --- | --- | --- |
| Week Number | Balance in Bank Acct. | 1. Write the equation of the line of best fit using the linear regression feature on your calculator.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. What does the slope mean in the context of this data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. What does the y-intercept mean in the context of this data?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_1. Use your regression equation to predict when the baseball team will have enough money to buy new equipment.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 0 | $7.50 |
| 1 | $53.00 |
| 2 | $60.22 |
| 3 | $85.64 |
| 4 | $92.88 |
| 5 | $99.41 |
| 6 | $116.67 |
| 7 | $122.72 |
| 8 | $134.60 |
| 9 | $150.53 |
|  |  |