**Scatter Plots and Lines of Best Fit**

**Directions: Make a scatterplot for the set of data. Draw the line of best. Calculate (by hand) the line of best fit. Then answer the questions. Show all your work. Finally compare your line of best fit to a linear regression of the data on your calculator.**

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.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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 line of best fit to predict how much it will cost for engine repairs if you get your oil changed 8 times per year.   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. Linear regression equation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| 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.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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 line of best fit 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 |

e) Linear regression equation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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 |
|  |  |

e) Linear regression equation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. 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.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 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 equation in part (a) 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 |
|  |  |

e) Linear regression equation\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_