

## Linear Correlation and Regression Problems

- The following data  $(x, y)$  is bivariate. Use the **TI-84 calculator** and the **5% level of significance** to test the claim that there is a linear correlation between the variables  $x$  and  $y$ . Determine the test statistic and the linear coefficient  $r$ .

<b>x</b>	6	10	11	13	17	18	22	25
<b>y</b>	18	16	17.9	13	16.8	15	12	15

- If there is a linear correlation between the variables  $x$  and  $y$ , what is the regression line?
- If there is a linear correlation and  $x = 20$ , then what is the value of  $y$ ?

- The following data  $(x, y)$  is bivariate. Use the **TI-84 calculator** and the **1% level of significance** to test the claim that there is a linear correlation between the variables  $x$  and  $y$ . Determine the test statistic and the linear coefficient  $r$ .

<b>x</b>	32	38	40	45	50	53	57	65
<b>y</b>	10	22	8	25	38	40	11	22

- If there is a linear correlation between the variables  $x$  and  $y$ , what is the regression line?
- If there is a linear correlation and  $x = 43$ , then what is the value of  $y$ ?

### Temperature and Cricket Chirps

Is there a linear correlation between the temperature and the number of times a cricket chirps in a minute? The bivariate data below is the number of chirps 1 minute and the temperature in Fahrenheit degrees.

- Use the **5% level of significance** to determine if there is sufficient evidence to conclude there is a linear correlation between the number of chirps in a minute and the and the temperature. Determine the test statistic and the linear coefficient  $r$ .

<b>Chirps in 1 Min</b>	882	1188	1104	864	1200	1032	960	900
<b>Temperature F</b>	69.7	93.3	84.3	76.3	82.6	82.6	71.6	79.6

- If there is a linear correlation what is the Best Fit (Regression) line?
- If there is a linear correlation and the number of chirps per minutes is 1000, what is the temperature in Fahrenheit degrees?

### Oscar Winners

Is there a linear correlation between the ages of Oscar Winners for women and men? The table below illustrates the Oscar Winners by age for women and men.

10. Use the **1% level of significance** to determine if there is a linear correlation between the ages of female Oscar Winners (Best Actress) and male Oscar winners (Best Actor). Determine the test statistic and the linear coefficient  $r$ .

Best Actress	28	30	29	61	32	33	45	29	62	22	44	54
Best Actor	43	37	38	45	50	48	60	50	39	55	44	33

11. If there is a linear correlation what is the Best Fit (Regression) line?  
12. If there is a linear correlation and the Best Actress Oscar Winner is 35 years of age, what is the age of the Best Actor Oscar Winner?

---

### Advertisements and Cars

The bivariate sample data below represent the number advertisements in a month and the number of cars sold.

13. Use the **1% level of significance** to test the claim that there is a linear correlation between the two quantities. Determine the test statistic and the linear coefficient  $r$ .

Advertisements	Cars Sold
6	15
20	31
0	10
14	16
25	28
16	20
28	40
18	25

14. If there is a linear correlation what is the Best Fit (Regression) line?  
15. If there is a linear correlation and there is 22 advertisements, what will be the number of cars sold?