**ECO 2200 Quiz 1**

1. The data contains information on time taken to run 1 mile by 5 individuals (in minutes). x denotes age and y denotes time. Find the correlation coefficient between x and y.

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| Obs. No. | x | y | $$\left(x-\overbar{x}\right)$$ | $$\left(y-\overbar{y}\right)$$ | $$\left(x-\overbar{x}\right)^{2}$$ | $$\left(y-\overbar{y}\right)^{2}$$ |
| 1 | 23 | 8 |  |  |  |  |
| 2 | 27 | 10 |  |  |  |  |
| 3 | 48 | 12 |  |  |  |  |
| 4 | 52 | 14 |  |  |  |  |
| 5 | 60 | 16 |  |  |  |  |
| Total: | $$\sum\_{i=1}^{5}x\_{i}$$ | $$\sum\_{i=1}^{5}y\_{i}$$ | $$\sum\_{i=1}^{5}(x\_{i}-\overbar{x})$$ | $$\sum\_{i=1}^{5}(y\_{i}-\overbar{y})$$ | $$\sum\_{i=1}^{5}\left(x\_{i}-\overbar{x}\right)^{2}$$ | $$\sum\_{i=1}^{5}\left(y\_{i}-\overbar{y}\right)^{2}$$ |

|  |  |  |
| --- | --- | --- |
| $$\left(\frac{x-\overbar{x}}{s\_{x}}\right)$$ | $$\left(\frac{y-\overbar{y}}{s\_{y}}\right)$$ | $$\left(\frac{x-\overbar{x}}{s\_{x}}\right)\left(\frac{y-\overbar{y}}{s\_{y}}\right)$$ |
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| $$\sum\_{i=1}^{5}\left(\frac{x\_{i}-\overbar{x}}{s\_{x}}\right)$$ | $$\sum\_{i=1}^{5}\left(\frac{y\_{i}-\overbar{y}}{s\_{y}}\right)$$ | $$\sum\_{i=1}^{5}\left(\frac{x-\overbar{x}}{s\_{x}}\right)\left(\frac{y-\overbar{y}}{s\_{y}}\right)$$ |

2. Suppose, in a future job, you are asked to calculate a correlation coefficient between a product’s sales and advertising expenditure. If you find a correlation coefficient close to zero, would you recommend examining a scatter plot of the data?

3. Can you provide an example of 2 variables x and y where the variables are correlated but one does not cause the other?