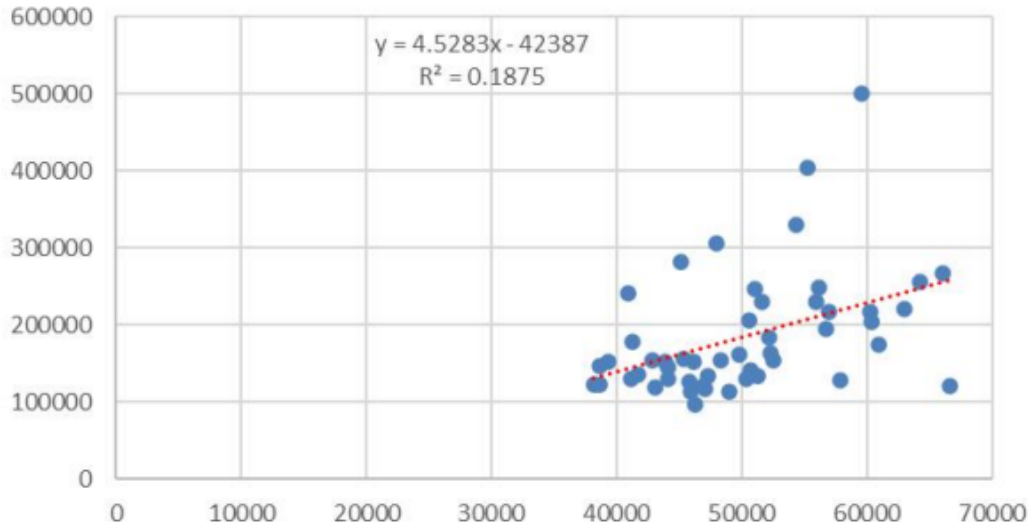
Module 5 : Lesson 3

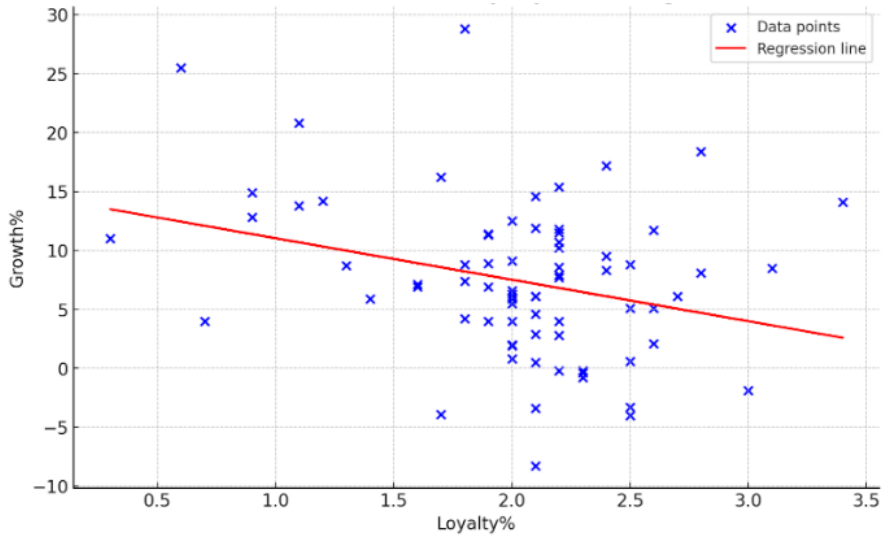
12.52



With a slope of 4.528, the estimated property price can rise by 4.528 dollars for every dollar increase in income. Since there is no observation indicating that a home's value can be less than zero, the intercept has no validity. Additionally, income cannot be zero.

12.70

(a).



(b).

With a correlation coefficient of -0.294, a weakly negative relationship is evident.

(c).

df = 74 -2 = 72

t-statistic = -2.606

p-value = 0.011

So reject the null hypothesis

(d).

Use of loyalty cards seems to be connected to a minor slowdown in sales growth. The link is not strong, though.

12.72

(a).

Price Coefficient: -0.00239 Price's P-value is 0.6019. The price coefficient has a p-value of 0.6019, which is significantly more than the significance level of 0.05 in absolute terms. This indicates that at the significance level of $\alpha = 0.05$, the coefficient of Price does not differ substantially from zero.

(b).

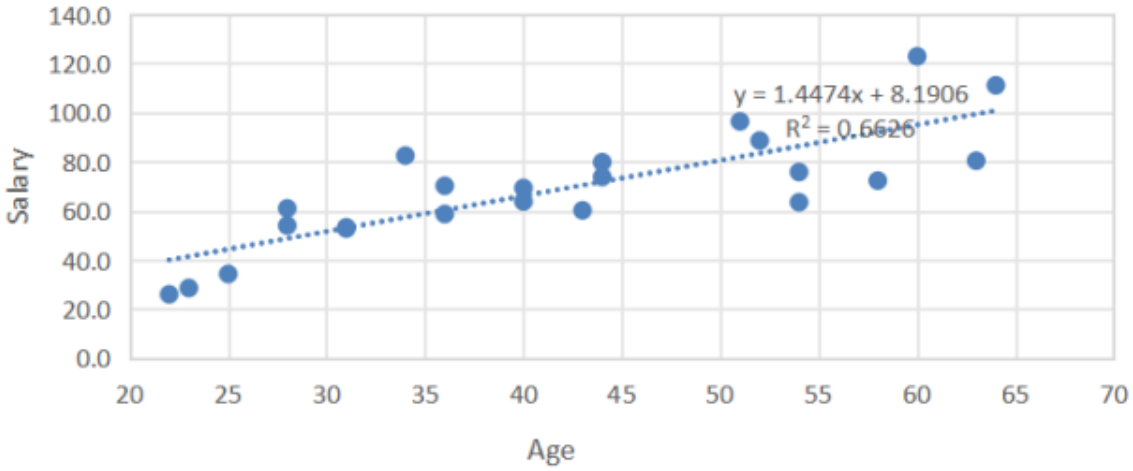
With an R2 = 0.01104, it may be inferred that the cost of stereo loudspeakers accounts for 1.1% of the variation in loudspeaker perceived sound quality. This would indicate unequivocally that the model explains very little of the variation in sound quality amongst speakers.

(c).

With a statistically insignificant strong negative coefficient of prices—that is, an exceptionally low value of the R2—no supporting evidence suggests that a higher price corresponds with a better level of sound quality. The aforementioned data indicate that there is little correlation between perceived sound quality and pricing. There are more aspects that are not included in this model that can be used to define sound quality.

12.73

(a).



(b).

y = 1.4474x + 8.1906, R2 = 0.6626

(c).

The employees' ages account for 66.26% of the wage variance, as indicated by the R2 value of 0.6626. This suggests that age influences earnings significantly, but there may be other factors at play as well that are not taken into account by this model.

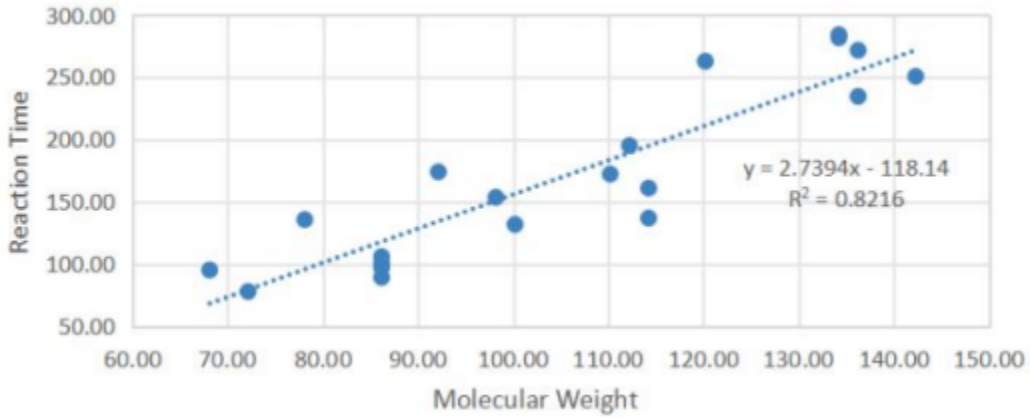
(d).

y = 1.4474x + 8.1906, y:predicted salary, x: age of the employee

(e).

The expected pay at age zero is represented by the intercept, which is 8.1906. This view is illogical since it is not feasible to employ people who are 0 years old.

12.76



Slope: 2.7394 indicates that the retention time increases by roughly 2.7394 seconds for every unit increase in molecular weight. According to this slope, which shows a positive association, compounds with larger molecular weights typically have longer retention times.

Intercept (-118.14): The theoretical retention period at zero molecular weight is indicated by the intercept value. However, this value is illogical because molecular weight cannot be 0.

The regression's excellent fit is indicated by R 2 = 0.8216. The molecular and retention time do indeed exhibit a significant positive linear relationship, as indicated by the regression line, which suggests that the molecular value positively correlates with the retention time.

12.77

(a).

The following is the regression equation derived from the output: The Participation Intercept (1752.44) is equal to the SAT Score −388.08×. This indicates that the average expected SAT score in a state with no SAT participation would be 1752.44 in theory. Since there isn't a single

state that doesn't participate, the intercept is enormous but also exceedingly speculative.
Slope (-388.08): This negative symbol indicates that we would anticipate losing roughly 388 points from the average SAT score for each additional percentage point that test-takers receive. With a t-statistic of -16.154, this is a significant effect, indicating a linearly high, strong, and negative link.

(b).
R2 = 0.8419: This indicates that changes in SAT participation rates account for 84.19% of the variance in average SAT score. These incredibly high R2 values demonstrate the regression model's excellent explanatory ability. The strength of the link is high because the slope coefficient is large and the R2 value is not negligible. Based on the participation rate effects, the data points are most likely tightly clustered around the regression line, producing a reliable mean SAT score projection.

(c).
A Broader Student Base: When the SAT is required in some areas for college admission or when student engagement is exceptionally high, a broad and varied group of kids generally take the exam, many of whom will likely have never considered attending college before. The average score is probably lowered as a result of include more students with a range of academic backgrounds. Test Preparation: Since places where the SAT is optional are likely to be offering shop holders, individuals who choose to take the test should prepare accordingly, The chosen group may have an elevated average SAT score in low participation states, where the stakes are higher since higher scores secure admission to institutions. Educational Resources and Emphasis: States with lower participation rates may not have enough educational resources available to them or may be concentrating on other subjects. Other standardized

tests, such as the ACT, may not be properly aligned with the subjects covered by the SAT because they are focused on other curriculum areas.

12.80

(a).

Since all slopes have negative values, the average price earned and average stock return have a negative connection.Hence, the average stock return declined as price/earnings increased. The intercept value indicates that the average stock return will be 20.67 to 28.10 for a zero average price/earnings ratio, which is not feasible. T value increases with the length of holding; after ten years, for instance, t value is larger. This implies that the inverse relationship between the P/E ratio and stock return will become more significant as the holding term increases. The p-value exceeds the significance level after a year.We cannot rule out the null hypothesis. However, The p-values are extremely low for longer holding periods (e.g., 10 years: 0.0000), indicating highly significant results. Rsquare increases with time, indicating that the average P/E ratio can account for a larger variance in average stock earnings over a longer period of time.

(b).

Yes, because the data is time-series and thus past stock return could influence current stock return.