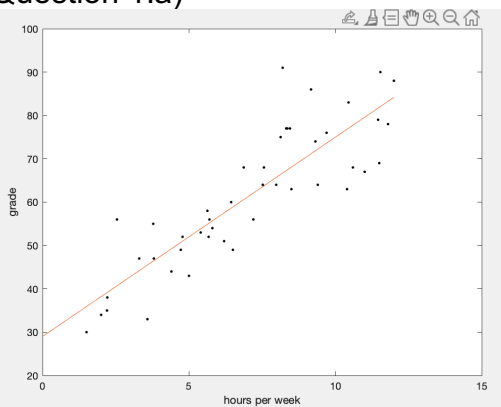


The purpose of the assignment is study student success in Math 232 based on number of hours spent studying Math 232 and their grades in Math 152.

Question 1.a)



$$A = \begin{bmatrix} 1 & 2 \\ 1 & 5 \\ \dots & \dots \\ 1 & 8.32 \end{bmatrix}; g = \begin{bmatrix} 34 \\ 43 \\ \dots \\ 77 \end{bmatrix}$$

(The second column of A is h or the hours spent studying Math 232. The matrix g is the number of the grade that students received in Math 232)

$$V_1 = (A^T A)^{-1} A^T g = \begin{bmatrix} 20.0258 \\ 4.5955 \end{bmatrix}$$

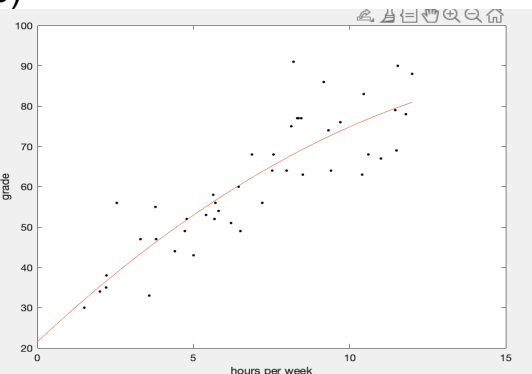
Thus, $gg = 20.0258 + 4.5955x$

(This is my best fit linear model through the data.)

At $gg=50$, $x = 4.5641$ (hours per week) = h_0 .

My prediction for the success point is $h_0 = 4.5641$ hours per week, that is the least amount of time that a student should spend to pass the course.

b)



$$B = \begin{bmatrix} 1 & 2 & 4 \\ 1 & 5 & 25 \\ \dots & \dots & \dots \\ 1 & 8.32 & 69.2224 \end{bmatrix}; g = \begin{bmatrix} 34 \\ 43 \\ \dots \\ 77 \end{bmatrix}$$

(The third column of A is h^2 or the square of hours spent studying Math 232.)

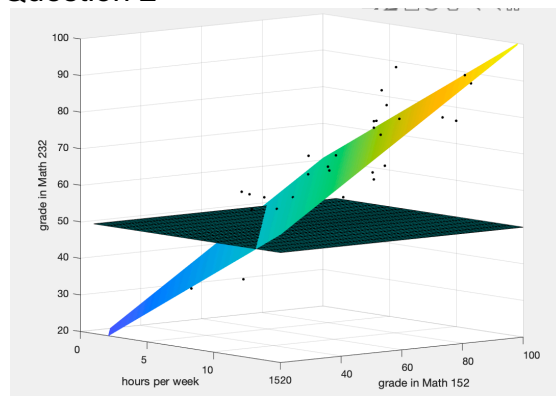
$$V_2 = (B^T B)^{-1} B^T g = \begin{bmatrix} 20.0258 \\ 4.5955 \\ 21.5718 \\ 7.2332 \\ -0.1905 \end{bmatrix}$$

$$g = 21.5718 + 7.2332 h - 0.1905 h^2$$

(This is my best quadratic model through the data.)

The predicted for the success point is $h_0 = 4.452$ hours per week, that is the least amount of time that a student should spend to pass the course. (It is quite near the predicted point of the linear model)

Question 2



The colored plane is my best fitting plane, the dark green plane is the plane, in which $g = 50$ for all h and k , and their intersection is the line of success rate.

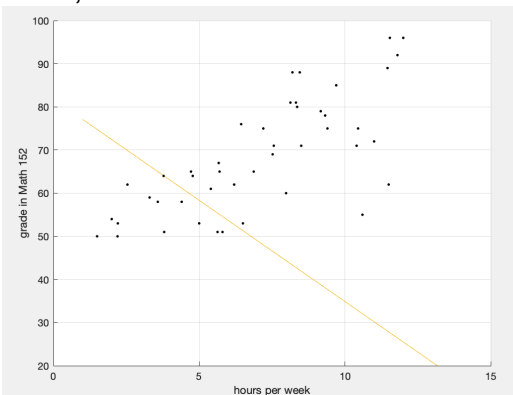
Our linear model for this data set is:

$$g = 2.7861 + 2.7085 h + 0.5771 k$$

Their intersection is:

$$50 = 2.7861 + 2.7085 h + 0.5771 k$$

Thus, $k \approx 81.8123 - 4.6933 h$ is the success line.



The right side of the line is the success side, which predict the student will receive a grade of at least 50%.