Problem 1 $P(X|Yes) = P(Age<30|Yes) \cdot P(income=m|Yes) \times P(student=yes|Yes) \times P(credit=F|Yes) \times P(purchase=Yes)$

$= \frac{2}{9} \times \frac{4}{9} \times \frac{6}{9} \times \frac{6}{9} \times \frac{9}{14} = 0.028$

$P(X|No) = P(Age<30|No) \cdot P(income=m|No) \times P(student=yes|No) \times P(credit=F|No) \times P(purchase=No)$

$= \frac{3}{5} \cdot \frac{2}{5} \cdot \frac{1}{5} \cdot \frac{2}{5} \cdot \frac{5}{14} = 0.0069$

$P(X|Yes) > P(X|No)$

$\Rightarrow$ The person will buy a computer #

Problem 2.

(a) $y = ax+b$

(X_1, X_2)

$a = \frac{2-1}{3-1} = 1, \quad a' = \frac{-1}{1} = -1, \quad Q = \begin{bmatrix} 2 \\ 2 \end{bmatrix}$

$\Rightarrow y = -x+b, \quad b = 4 \Rightarrow x+y = 4$

(X_1, X_3)

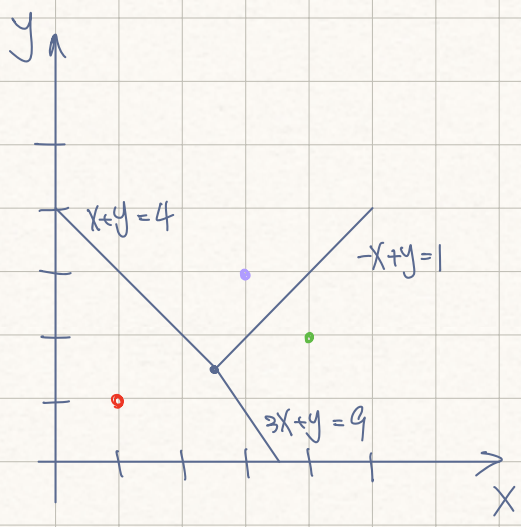
$a = \frac{2-1}{4-1} = \frac{1}{3}, \quad a' = \frac{-1}{\frac{1}{3}} = -3, \quad Q = \begin{bmatrix} 2.5 \\ 1.5 \end{bmatrix}$

$\Rightarrow y = -3x+b, \quad b = 9 \Rightarrow 3x+y = 9$

(X_2, X_3)

$a = \frac{2-3}{4-3} = -1, \quad a' = \frac{-1}{-1} = 1, \quad Q = \begin{bmatrix} 3.5 \\ 3.5 \end{bmatrix}$

$\Rightarrow y = x+b, \quad b = -1 \Rightarrow -x+y = -1$



(b). $d_M(X_1, X_2) = \sqrt{\frac{1}{2}\left(X_1^{(1)} - X_2^{(1)}\right)^2 + \left(X_1^{(2)} - X_2^{(2)}\right)^2}$

$(X_1, X_2) \Rightarrow \sqrt{\frac{1}{2}(x-1)^2 + (y-1)^2} = \sqrt{\frac{1}{2}(x-3)^2 + (y-3)^2}$

$\Rightarrow 0.5x + y = 3$

$(X_1, X_3) \Rightarrow \sqrt{\frac{1}{2}(x-1)^2 + (y-1)^2} = \sqrt{\frac{1}{2}(x-4)^2 + (y-2)^2}$

$\Rightarrow 1.5x + y = 5.5$

$(X_2, X_3) \Rightarrow \sqrt{\frac{1}{2}(x-3)^2 + (y-3)^2} + \sqrt{\frac{1}{2}(x-4)^2 + (y-2)^2}$

$\Rightarrow -0.5x + y = 0.75$ #