Task 2.2 - Question on Ridge regression:

(A) Low: It has a lot of slope in it, which means we have little lambda.
(B) Low: It is very low (=0) as it is showing the linear regression
(C) High: There's a high regularization as the slop converted into a straight line
(D) Neither: This line is not in line with our required linear regression line, so lambda is neither high nor low, it's out of the planet.

High lambda: When lambda is high the slope becomes asymptotically close to zero. So it seems like C.

Low lambda: results in a smaller slope and doesn't overfit the data as well so it is B.

Neither: one thing to remember about ridge regression is that it can only reduce the slope to near zero, not zero, therefore C could never be zero

Further Outliers frequently drag the regression line inwards, resulting in a poor estimator and a change in the sign of the coefficient parameter. Because outliers frequently drag the regression line to itself, resulting in a faulty estimator and a change in the sign of the coefficient parameter, D could have been formed as a result of the presence of an outlier.

Task 3.2 - Question on Logistic regression:

Regularization means shrinking the weights, when we'll shrink weights the value of slope will decrease.

L2: When we regularise theta2, the resulting border becomes less reliant on the value of x2 and hence more vertical. L2 appears to be more horizontal in this case than in the unregularized solution, therefore it cannot be due to penalizing theta2.

- L2 line can't come from our regularization, as regularization has a penalty on theta2, which means when we regularize theta2 it will make effects on x2(more vertically), but here L2 is showing different behavior(more horizontally) which can't be received by penalizing theta2.

L3: Although theta2 is modest in comparison to theta 1 (as demonstrated by the high slope), it could be compelled by a big regularisation parameter C to assign a low log probability to the observed labels.

- L3 line is closer to x2-axis which means lower theta2, so this can be our line made by the regularization from the w2, as I've described in the L2, should be vertically and near to x2, and it is fitting the model well.

L4: We get a totally vertical boundary (line x1 = 0 or the x2 axis) for very large C. L4 is reflected across the x2 axis and indicates a less satisfactory solution than L3.

- L4 line is very vertical, but we can't get that kind of line, as C is very large, which means if the theta2 is small, the penalty will be smaller. This line shows that it already passed the optimal point, because of this it is not the best line as it's not classifying those two classes well.

So my choice is **L3**.