Data Mining, CSCI 347, Fall 2019
Evaluation – Counting Costs, Nov. 13

1. A confusion matrix for a model is given. Tell the accuracy of the model.

		Predicted class			
		a	*b*	*c*	*total*
Actual class	*a*	88	10	2	*100*
	b	14	40	6	*60*
	c	18	10	12	*40*
	total	*120*	*60*	*20*	

2. The same confusion matrix is given below on the left. On the right is a confusion matrix for a random predictor. Calculate the Kappa statistic to measure the relative improvement of the model over a random predictor.

Model Predictions

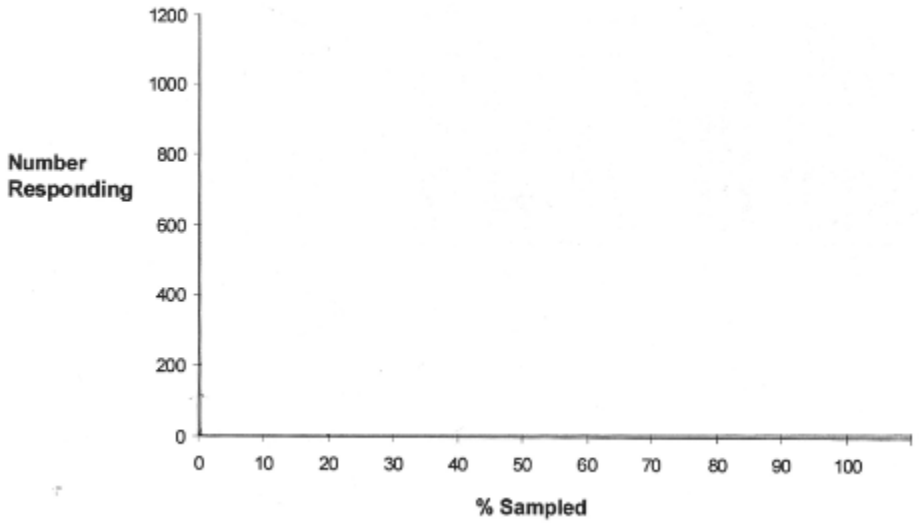
		Predicted class			
		a	*b*	*c*	*total*
Actual class	*a*	88	10	2	*100*
	b	14	40	6	*60*
	c	18	10	12	*40*
	total	*120*	*60*	*20*	

Random Predictor

		Predicted class			
		a	*b*	*c*	*total*
Actual class	*a*	60	30	10	*100*
	b	36	18	6	*60*
	c	24	12	4	*40*
	total	*120*	*60*	*20*	

3. Example: Say that we are going to do a direct mailing and we have a million addresses in our database. In general we know that 0.1% (0.001) household will respond to our mailing. Say that using data mining, we have an algorithm that identifies a subset of 100,000 of the most promising addresses, where these households are likely to responds at a rate of 0.4% Another model identifies a subset of 400,000 household where 0.2% are likely to respond.

   Create a lift chart to visualize this information.
   x axis is the percent sampled
   y axis is number of true positives



4. Say when predicting the recurrence of breast cancer, 70% of the women that survived breast cancer had not had recurrence within 5 years. The other 30% had. Call the recurrence of breast cancer a positive. For parts a and b, say that there are 100 women.

    a. Calculate the F1 score of a model that always predicts that there will be no recurrence.

    b. Calculate the F1 score if a model always predicts that there will be a recurrence.

    c. CART (Classification And Regression Trees) for 300 women, has the confusion matrix:

		Predicted	
Actual		**Recurrence**	**No Recurrence**
	Recurrence	77	13
	No Recurrence	39	171

Calculate the F1 score.