QF632-2025-W4

Number of participants: 43

1. Consider two tasks on the same dataset—predicting house prices (continuous) versus predicting “high” vs. “low” price (binary). Which statement is most accurate?

13 correct answers
out of 31 respondents

	The binary classification task is always easier because it only requires two output labels.	48%	15 votes
✓	The regression task can leverage all continuous variation and thus often yields richer evaluation insights.	42%	13 votes
	Converting regression to classification never changes the relative model ranking by performance.	6%	2 votes
	Classification evaluation metrics (e.g.precision/recall) are directly comparable to regression metrics (e.g.MAE).	3%	1 vote

2. Which of these algorithm–metric pairings is mismatched for its task type?

18 correct answers
out of 27 respondents

	Regression with ridge regression evaluated by RMSE.	4%	1 vote
	Classification with random forests evaluated by ROC–AUC.	7%	2 votes
✓	Regression with support vector regression evaluated by accuracy.	67%	18 votes
	Classification with logistic regression evaluated by F1 score.	22%	6 votes

3. In using a linear regression model for binary classification via thresholding at $\tau = 0.5$, the resulting decision boundary is the set of points satisfying

2 correct answers
out of 26 respondents

	$w^\top x + b = 0$	4%	1 vote
✓	$w^\top x + b = 0.5$	8%	2 votes
	$\sigma(w^\top x + b) = 0.5$ where σ is the logistic sigmoid	69%	18 votes
	$\lvert w^\top x + b \rvert \leq 0.5$	19%	5 votes

4. Suppose you fit a linear regression on binary labels $0, 1$ and observe very large magnitude predictions (e.g.\ -10 or $+15$). This most directly indicates:

27 correct answers
out of 29 respondents

	Severe overfitting due to too many features.	7%	2 votes
	Violation of linearity in the feature map.	0%	0 votes
✓	The lack of an output-range constraint in OLS when modeling probabilities.	93%	27 votes
	That the Gaussian-error assumption is perfectly satisfied.	0%	0 votes

5. For a random variable $y \sim \text{Bernoulli}(p)$ with PMF $P(y \mid p) = p^y(1-p)^{1-y}, \quad y \in \{0,1\}$, what is $\mathbb{E}[y]$?

14 correct answers
out of 25 respondents

	$1-p$	8%	2 votes
✓	p	56%	14 votes
	$p(1-p)$	36%	9 votes
	$p^2 + (1-p)^2$	0%	0 votes

6. At which value of z does this predict $P(y=1) = 0.5$?

23 correct answers
out of 27 respondents

	$z = 1$	0%	0 votes
✓	$z = 0$	85%	23 votes
	$z = -1$	4%	1 vote
	$z = \log 2$	11%	3 votes

7. Why do we take the logarithm of the likelihood when fitting logistic regression?

21 correct answers
out of 29 respondents

	To convert a sum into a product.	0%	0 votes
✓	To convert a product into a sum and avoid numerical underflow.	72%	21 votes
	Because the log-likelihood is always bounded above by 1.	24%	7 votes
	To make the model non-convex.	3%	1 vote

8. Which of the following is true about the binary cross-entropy loss $J(\beta) = -\ell(\beta)$ in logistic regression?

13 correct answers
out of 25 respondents

✓	It is convex in the parameter vector β .	52%	13 votes
	It is non-differentiable at $p(x_i) = 0.5$.	0%	0 votes
	It places no penalty on confident but wrong predictions.	32%	8 votes
	It is bounded above by 1.	16%	4 votes

9. If missing an actual event (a false negative) is twice as costly as raising a false alarm (a false positive), which metric should you prioritize improving?

21 correct answers
out of 30 respondents

	Precision	13%	4 votes
✓	Recall	70%	21 votes
	Specificity	10%	3 votes
	Accuracy	7%	2 votes

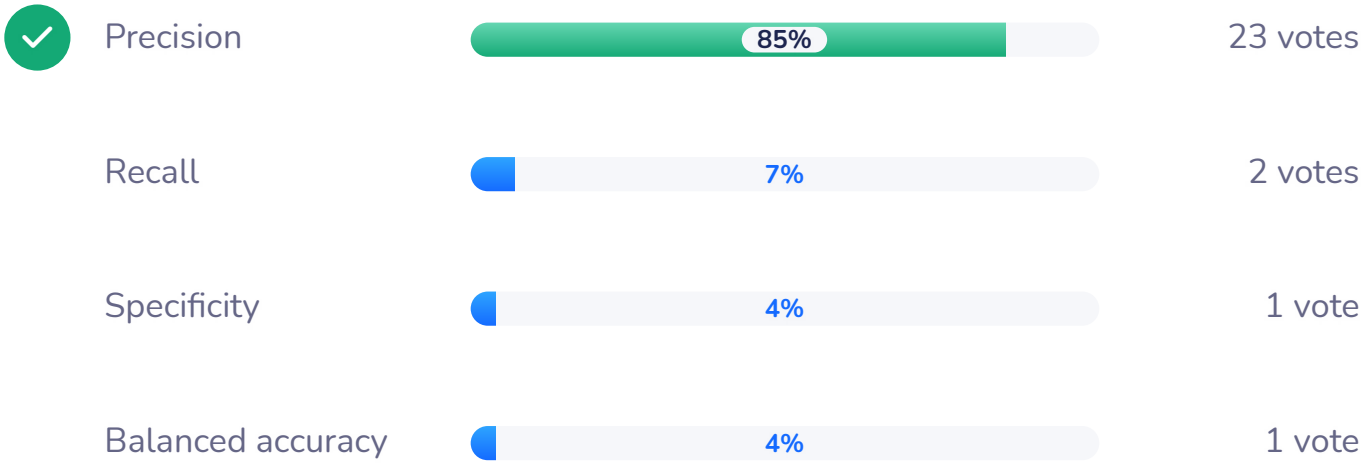
10. Which metric measures the proportion of actual positives that are correctly identified?

7 correct answers
out of 28 respondents

	Precision	43%	12 votes
✓	Recall	25%	7 votes
	Specificity	0%	0 votes
	Accuracy	32%	9 votes

11. Which metric measures the proportion of predicted positives that are actually correct?

23 correct answers
out of 27 respondents



12. In a dataset with severe class imbalance (very few positives), which metric is least informative by itself?

12 correct answers
out of 24 respondents