Assignment 6. Probability distributions

Your name

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Solve the following problems – each problem on a separate page – and submit to Gradescope for grading.

1 Poisson [2 points]

In a certain factory accidents occur at a mean rate of 2 per week. Find the probability of less than 3 accidents occurring in a given month.

Show steps of your computation.

2 Normal distribution [4 points]

Replacement time for the cell phone devices due to failure is normally distributed with a mean of $\mu = 8.2$ years and standard deviation of $\sigma = 1.1$ years.

- (a) What is the probability that a randomly selected device will be replaced in less than 5 years?
- (b) As a manufacturer, what period of warranty should I declare if I want only 1% of my devices to fail during the warranty period?

For a final answer you can use the values in the tables.
However, for a full grade please explain your reasoning: do not just give a numeric answer.

3 Naive Bayes with numeric attributes [5 points]

The historical data about tax evasion is presented in the table below:

Tid	Refund	Marital status	Taxable income	Evade
1	Yes	Single	125K	No
2	No	Married	100K	No
3	No	Single	70K	No
4	Yes	Married	120K	No
5	No	Divorced	95K	Yes
6	No	Married	60K	No
7	Yes	Divorced	220K	No
8	No	Single	85K	Yes
9	No	Married	75K	No
10	No	Single	90K	Yes

Use Naive Bayes classifier to predict the tax evasion for the following record:
Classify: $(, No, Married, 95K, ?)$
Apply the Laplace normalization for categorical attributes.
Also provide the actual probability of cheating in your answer.

Show your steps.

I classify this record as:
The probability of tax evasion is: