MICROSOFT AZURE AI FUNDAMENTALS (AI-900)

Question 1 (Describe Artificial Intelligence workloads and considerations)

A company employs a team of customer service agents to provide telephone and email support to customers.
The company develops a webchat bot to provide automated answers to common customer queries.
Which business benefit should the company expect as a result of creating the webchat bot solution?

- **A.** increased sales
- **B.** a reduced workload for the customer service agents
- **C.** improved product reliability

Answer : B

Question 2

For a machine learning progress, how should you split data for training and evaluation?

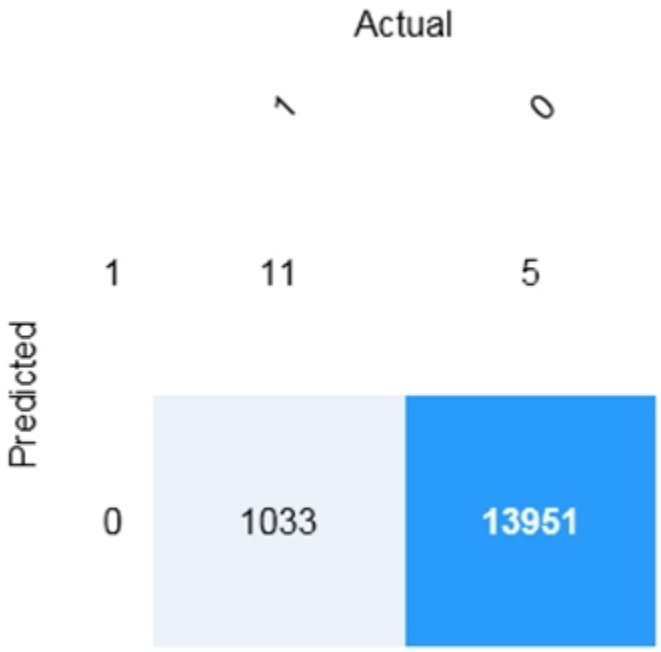
- **A.** Use features for training and labels for evaluation.
- **B.** Randomly split the data into rows for training and rows for evaluation.
- **C.** Use labels for training and features for evaluation.
- **D.** Randomly split the data into columns for training and columns for evaluation.

Answer: **D**

Explanation:
In Azure Machine Learning, the percentage split is the available technique to split the data. In this technique, random data of a given percentage will be split to train and test data.
Reference:
https://www.sqlshack.com/prediction-in-azure-machine-learning/

Question 3

HOTSPOT -
You are developing a model to predict events by using classification.
You have a confusion matrix for the model scored on test data as shown in the following exhibit.



Use the drop-down menus to select the answer choice that completes each statement based on the information presented in the graphic.
NOTE: Each correct selection is worth one point.
Hot Area:

Answer Area

There are **[answer choice]** correctly predicted positives.

- 5
- 11
- 1,033
- 13,951

There are **[answer choice]** false negatives.

- 5
- 11
- 1,033
- 13,951

Answer:

Answer Area

There are **[answer choice]** correctly predicted positives.

- 5
- **11**
- 1,033
- 13,951

There are **[answer choice]** false negatives.

- 5
- 11
- **1,033**
- 13,951

Explanation:

Box 1: 11 -

	Predicted	
	Positive	Negative
Actual True	**TP**	**FN**
Actual False	**FP**	**TN**

TP = True Positive.
The class labels in the training set can take on only two possible values, which we usually refer to as positive or negative. The positive and negative instances that a classifier predicts correctly are called true positives (TP) and true negatives (TN), respectively. Similarly, the incorrectly classified instances are called false positives (FP) and false negatives (FN).

Box 2: 1,033 -

FN = False Negative -
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/studio/evaluate-model-performance

Question 4

You build a machine learning model by using the automated machine learning user interface (UI).

You need to ensure that the model meets the Microsoft transparency principle for responsible AI.
What should you do?

- **A.** Set Validation type to Auto.
- **B.** Enable Explain best model.
- **C.** Set Primary metric to accuracy.
- **D.** Set Max concurrent iterations to 0.

Answer: **B**

Explanation:
Model Explain Ability.
Most businesses run on trust and being able to open the ML "black box" helps build transparency and trust. In heavily regulated industries like healthcare and banking, it is critical to comply with regulations and best practices. One key aspect of this is understanding the relationship between input variables (features) and model output. Knowing both the magnitude and direction of the impact each feature (feature importance) has on the predicted value helps better understand and explain the model. With model explain ability, we enable you to understand feature importance as part of automated ML runs.
Reference:
https://azure.microsoft.com/en-us/blog/new-automated-machine-learning-capabilities-in-azure-machine-learning-service/

Question 5:

HOTSPOT -
For each of the following statements, select Yes if the statement is true. Otherwise, select No.
NOTE: Each correct selection is worth one point.
Hot Area:

Answer Area

Statements	Yes	No
Forecasting housing prices based on historical data is an example of anomaly detection.	○	○
Identifying suspicious sign-ins by looking for deviations from usual patterns is an example of anomaly detection.	○	○
Predicting whether a patient will develop diabetes based on the patient's medical history is an example of anomaly detection.	○	○

Answer :

Answer Area

Statements	Yes	No
Forecasting housing prices based on historical data is an example of anomaly detection.	○	○
Identifying suspicious sign-ins by looking for deviations from usual patterns is an example of anomaly detection.	○	○
Predicting whether a patient will develop diabetes based on the patient's medical history is an example of anomaly detection.	○	○

Explanation:
Anomaly detection encompasses many important tasks in machine learning:
Identifying transactions that are potentially fraudulent.
Learning patterns that indicate that a network intrusion has occurred.
Finding abnormal clusters of patients.
Checking values entered into a system.
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/anomaly-detection

Question 6:

HOTSPOT -
To complete the sentence, select the appropriate option in the answer area.
Hot Area:

Answer Area

The handling of unusual or missing values provided to an AI system is a consideration for the Microsoft [▼] principle for responsible AI.

- inclusiveness
- privacy and security
- reliability and safety
- transparency

Answer
:

Answer Area

The handling of unusual or missing values provided to an AI system is a consideration for the Microsoft [ ] principle for responsible AI.

- inclusiveness
- privacy and security
- reliability and safety
- transparency

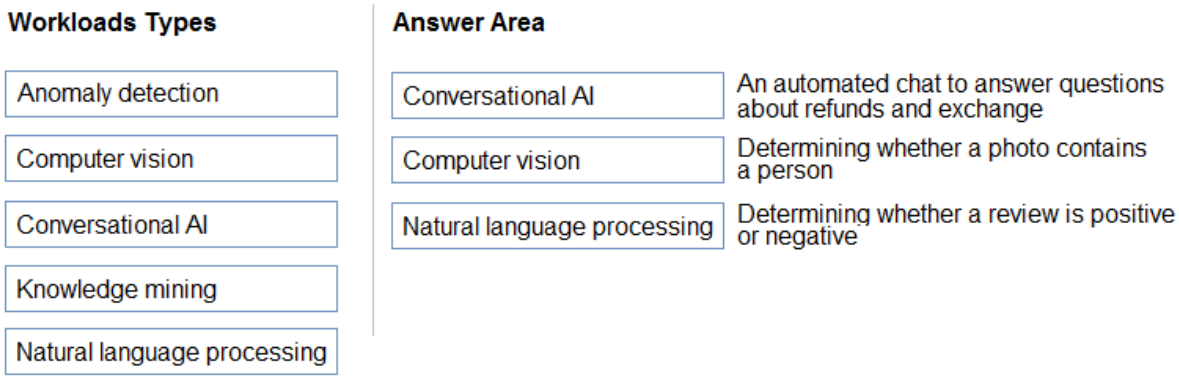
Explanation:
Privacy and security.
As AI becomes more prevalent, protecting privacy and securing important personal and business information is becoming more critical and complex. With AI, privacy and data security issues require especially close attention because access to data is essential for AI systems to make accurate and informed predictions and decisions about people. AI systems must comply with privacy laws that require transparency about the collection, use, and storage of data and mandate that consumers have appropriate controls to choose how their data is used. At Microsoft, we are continuing to research privacy and security breakthroughs (see next unit) and invest in robust compliance processes to ensure that data collected and used by our AI systems is handled responsibly.
Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

Question 7:

DRAG DROP -
Match the types of AI workloads to the appropriate scenarios.
To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.
NOTE: Each correct selection is worth one point.
Select and Place:

Workloads Types	Answer Area	
Anomaly detection	Workload Type	An automated chat to answer questions about refunds and exchange
Computer vision	Workload Type	Determining whether a photo contains a person
Conversational AI	Workload Type	Determining whether a review is positive or negative
Knowledge mining		
Natural language processing		

Answer:



Explanation:
Box 3: Natural language processing
Natural language processing (NLP) is used for tasks such as sentiment analysis, topic detection, language detection, key phrase extraction, and document categorization.
Reference:
https://docs.microsoft.com/en-us/azure/architecture/data-guide/technology-choices/natural-language-processing

Question 8:

You are designing an AI system that empowers everyone, including people who have hearing, visual, and other impairments.
This is an example of which Microsoft guiding principle for responsible AI?

- **A.** fairness
- **B.** inclusiveness
- **C.** reliability and safety
- **D.** accountability

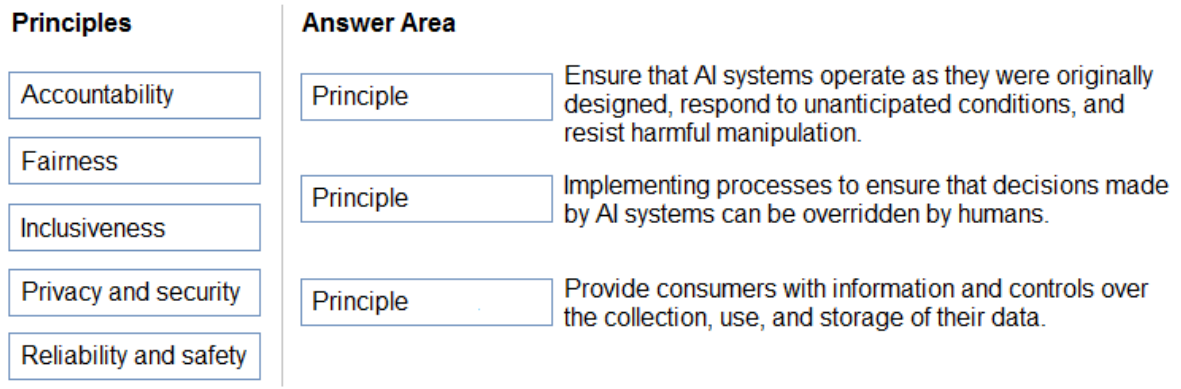
Answer : **B**

Explanation:
Inclusiveness: At Microsoft, we firmly believe everyone should benefit from intelligent technology, meaning it must incorporate and address a broad range of human needs and experiences. For the 1 billion people with disabilities around the world, AI technologies can be a game-changer.
Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

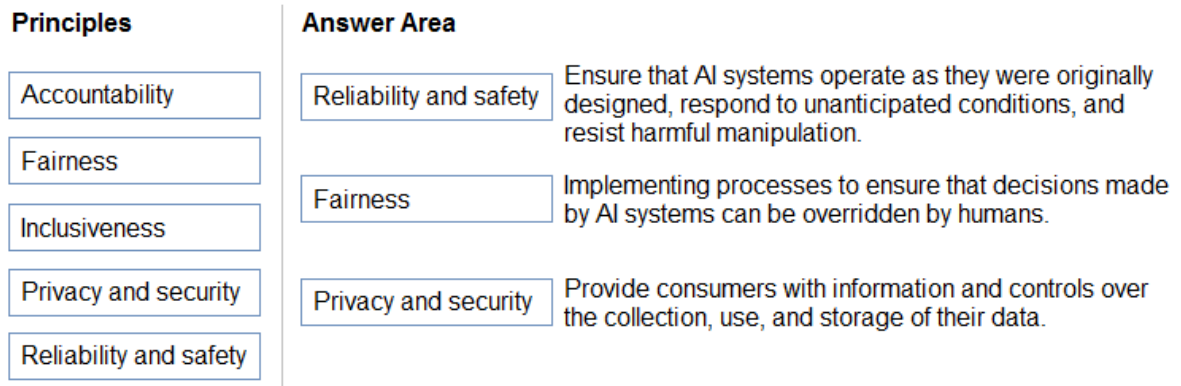
Question 9:

DRAG DROP -
Match the Microsoft guiding principles for responsible AI to the appropriate descriptions.
To answer, drag the appropriate principle from the column on the left to its description on

the right. Each principle may be used once, more than once, or not at all.
NOTE: Each correct selection is worth one point.
Select and Place:



Answer :



Explanation:

Box 1: Reliability and safety -
To build trust, it's critical that AI systems operate reliably, safely, and consistently under normal circumstances and in unexpected conditions. These systems should be able to operate as they were originally designed, respond safely to unanticipated conditions, and resist harmful manipulation.

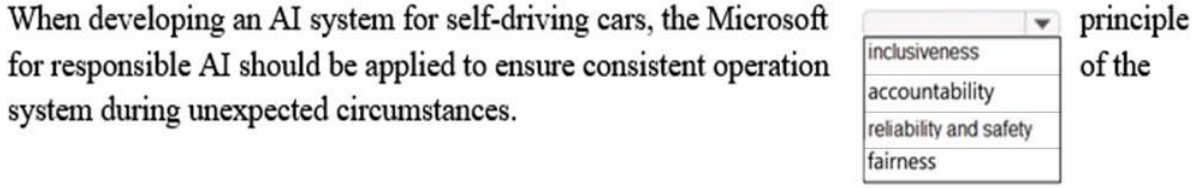
Box 2: Fairness -
Fairness: AI systems should treat everyone fairly and avoid affecting similarly situated groups of people in different ways. For example, when AI systems provide guidance on medical treatment, loan applications, or employment, they should make the same recommendations to everyone with similar symptoms, financial circumstances, or professional qualifications. We believe that mitigating bias starts with people understanding the implications and limitations of AI predictions and recommendations. Ultimately, people should supplement AI decisions with sound human judgment and be held accountable for consequential decisions that affect others.

Box 3: Privacy and security -
As AI becomes more prevalent, protecting privacy and securing important personal and

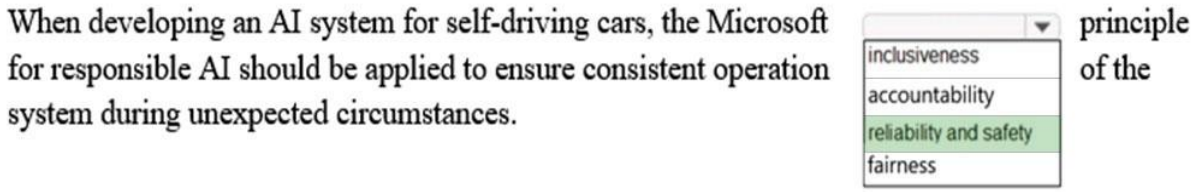
business information is becoming more critical and complex. With AI, privacy and data security issues require especially close attention because access to data is essential for AI systems to make accurate and informed predictions and decisions about people. AI systems must comply with privacy laws that require transparency about the collection, use, and storage of data and mandate that consumers have appropriate controls to choose how their data is used
Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

Question 10:

HOTSPOT -
To complete the sentence, select the appropriate option in the answer area.
Hot Area:



Answer:



Explanation:
Reliability and safety: To build trust, it's critical that AI systems operate reliably, safely, and consistently under normal circumstances and in unexpected conditions.
These systems should be able to operate as they were originally designed, respond safely to unanticipated conditions, and resist harmful manipulation.
Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

Question 11:

You are building an AI system.
Which task should you include to ensure that the service meets the Microsoft transparency principle for responsible AI?

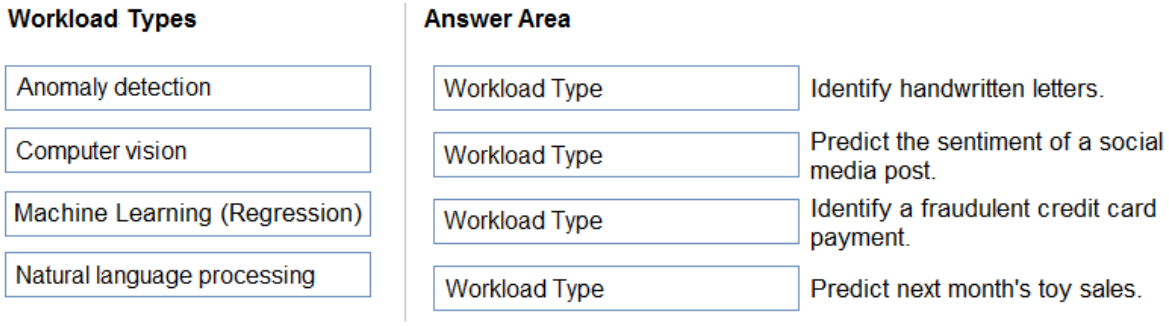
- **A.** Ensure that all visuals have an associated text that can be read by a screen reader.
- **B.** Enable autoscaling to ensure that a service scales based on demand.
- **C.** Provide documentation to help developers debug code.
- **D.** Ensure that a training dataset is representative of the population.

Answer : **C**

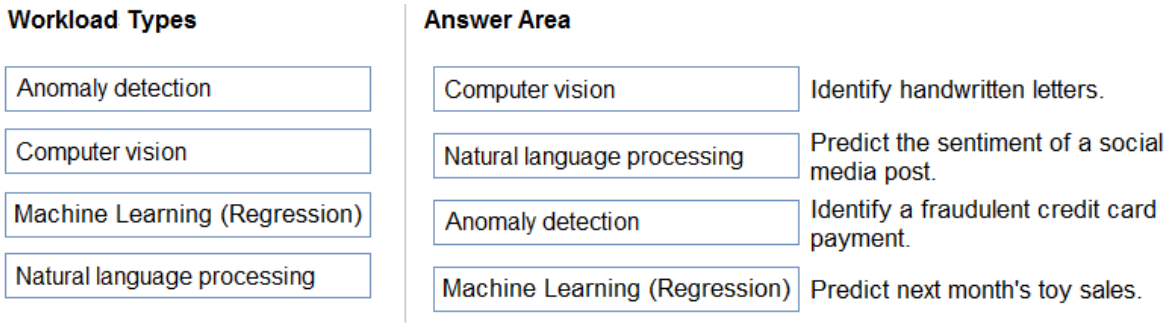
Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

Question 12:

DRAG DROP -
Match the types of AI workloads to the appropriate scenarios.
To answer, drag the appropriate workload type from the column on the left to its scenario on the right. Each workload type may be used once, more than once, or not at all.
NOTE: Each correct selection is worth one point.
Select and Place:



Answer:



Reference:
https://docs.microsoft.com/en-us/learn/paths/get-started-with-artificial-intelligence-on-azure/

Question 13:

Your company is exploring the use of voice recognition technologies in its smart home devices. The company wants to identify any barriers that might unintentionally leave out specific user groups.
This an example of which Microsoft guiding principle for responsible AI?

- **A.** accountability
- **B.** fairness

- **C.** inclusiveness
- **D.** privacy and security

Answer : **C**

Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

Question 14:

What are three Microsoft guiding principles for responsible AI? Each correct answer presents a complete solution.
NOTE: Each correct selection is worth one point.

- **A.** knowledgeability
- **B.** decisiveness
- **C.** inclusiveness
- **D.** fairness
- **E.** opinionatedness
- **F.** reliability and safety

Answer: CDF

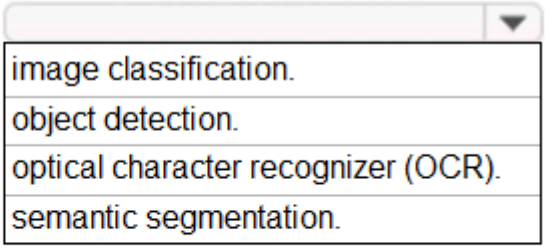
Reference:
https://docs.microsoft.com/en-us/learn/modules/responsible-ai-principles/4-guiding-principles

Question 15:

HOTSPOT -
To complete the sentence, select the appropriate option in the answer area.
Hot Area:

Answer Area

Returning a bounding box that indicates the location of a vehicle in an image is an example of



Answer :

Answer Area

Returning a bounding box that indicates the location of a vehicle in an image is an example of

image classification.
object detection.
optical character recognizer (OCR).
semantic segmentation.

Reference:
https://docs.microsoft.com/en-us/azure/cognitive-services/computer-vision/concept-object-detection

Question 16:

HOTSPOT -
To complete the sentence, select the appropriate option in the answer area.
Hot Area:

Answer Area

	is used to generate additional features.
Feature engineering	
Feature selection	
Model evaluation	
Model training	

Answer :

Answer Area

	is used to generate additional features.
Feature engineering	
Feature selection	
Model evaluation	
Model training	

Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/team-data-science-process/create-features

Question 17:

You run a charity event that involves posting photos of people wearing sunglasses on Twitter.
You need to ensure that you only retweet photos that meet the following requirements:
-> Include one or more faces.
-> Contain at least one person wearing sunglasses.
What should you use to analyze the images?

- **A.** the Verify operation in the Face service
- **B.** the Detect operation in the Face service
- **C.** the Describe Image operation in the Computer Vision service
- **D.** the Analyze Image operation in the Computer Vision service

Answer: B

Reference:
https://docs.microsoft.com/en-us/azure/cognitive-services/face/overview

Question 18:

Which metric can you use to evaluate a classification model?

- **A.** true positive rate
- **B.** mean absolute error (MAE)
- **C.** coefficient of determination (R2)
- **D.** root mean squared error (RMSE)

Answer : **A**

Explanation:
What does a good model look like?
An ROC curve that approaches the top left corner with 100% true positive rate and 0% false positive rate will be the best model. A random model would display as a flat line from the bottom left to the top right corner. Worse than random would dip below the y=x line.
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/how-to-understand-automated-ml#classification

Question 19:

Which two components can you drag onto a canvas in Azure Machine Learning designer?
Each correct answer presents a complete solution.
NOTE: Each correct selection is worth one point.

- **A.** dataset
- **B.** compute
- **C.** pipeline

- **D.** module

Answer : **AD**

Explanation:
You can drag-and-drop datasets and modules onto the canvas.
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/concept-designer

Question 20:

You need to create a training dataset and validation dataset from an existing dataset. Which module in the Azure Machine Learning designer should you use?

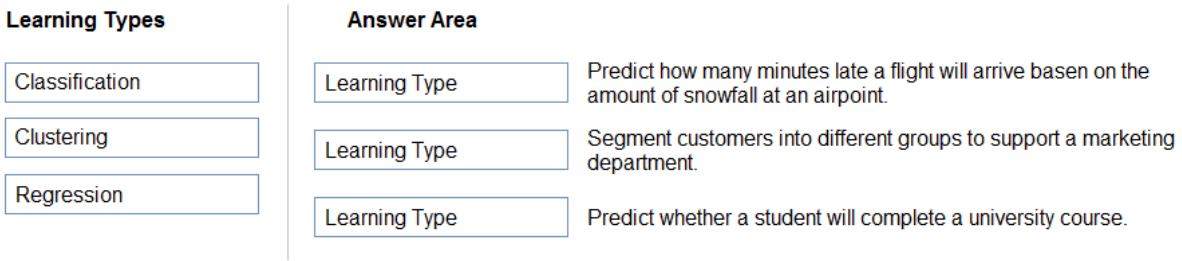
- **A.** Select Columns in Dataset
- **B.** Add Rows
- **C.** Split Data
- **D.** Join Data

Answer : **C**

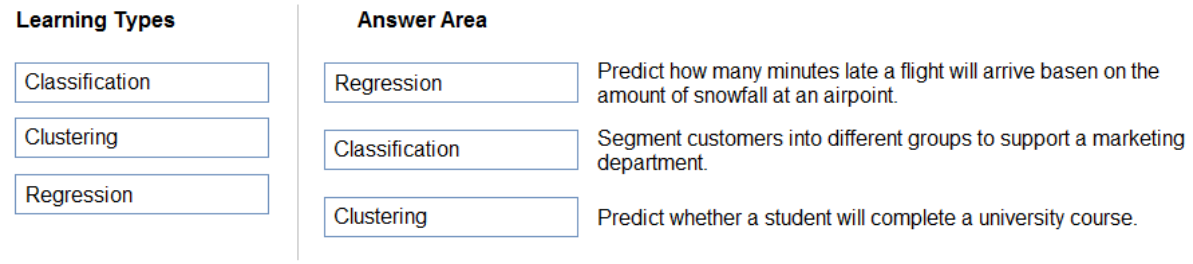
Explanation:
A common way of evaluating a model is to divide the data into a training and test set by using Split Data, and then validate the model on the training data.
Use the Split Data module to divide a dataset into two distinct sets.
The studio currently supports training/validation data splits
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/how-to-configure-cross-validation-data-splits

Question 21:

DRAG DROP -
Match the types of machine learning to the appropriate scenarios.
To answer, drag the appropriate machine learning type from the column on the left to its scenario on the right. Each machine learning type may be used once, more than once, or not at all.
NOTE: Each correct selection is worth one point.
Select and Place:



Answer:



Explanation:

Box 1: Regression -
In the most basic sense, regression refers to prediction of a numeric target.
Linear regression attempts to establish a linear relationship between one or more independent variables and a numeric outcome, or dependent variable.
You use this module to define a linear regression method, and then train a model using a labeled dataset. The trained model can then be used to make predictions.

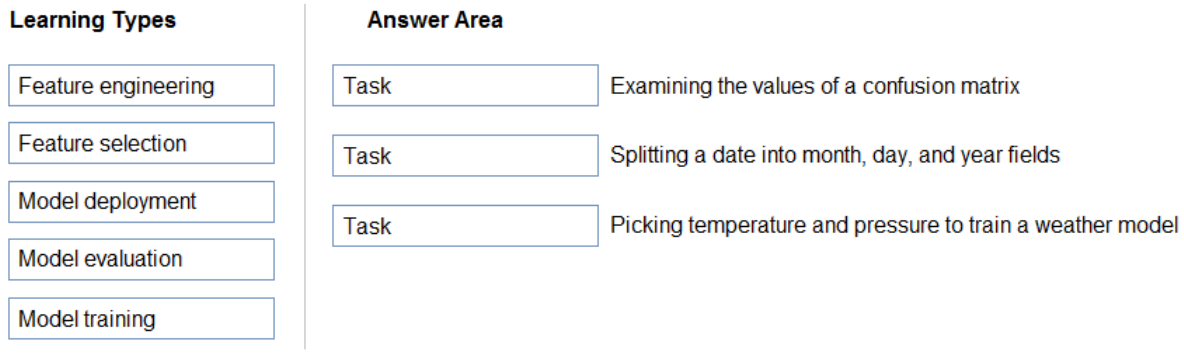
Box 2: Classification -
Classification is a machine learning method that uses data to determine the category, type, or class of an item or row of data.

Box 3: Clustering -
Clustering, in machine learning, is a method of grouping data points into similar clusters. It is also called segmentation.
Over the years, many clustering algorithms have been developed. Almost all clustering algorithms use the features of individual items to find similar items. For example, you might apply clustering to find similar people by demographics. You might use clustering with text analysis to group sentences with similar topics or sentiment.
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/linear-regression

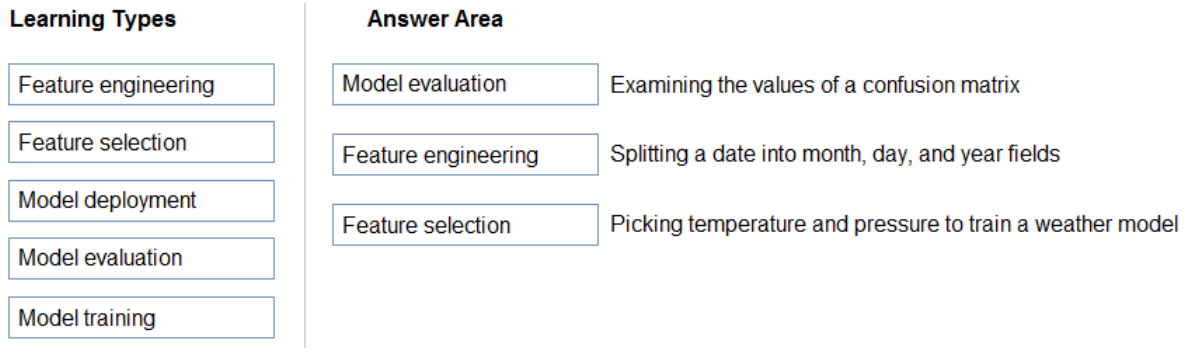
Question 22:

DRAG DROP -
Match the machine learning tasks to the appropriate scenarios.
To answer, drag the appropriate task from the column on the left to its scenario on the right.
Each task may be used once, more than once, or not at all.
NOTE: Each correct selection is worth one point.

Select and Place:



Answer:



Explanation:

Box 1: Model evaluation -
The Model evaluation module outputs a confusion matrix showing the number of true positives, false negatives, false positives, and true negatives, as well as
ROC, Precision/Recall, and Lift curves.

Box 2: Feature engineering -
Feature engineering is the process of using domain knowledge of the data to create features that help ML algorithms learn better. In Azure Machine Learning, scaling and normalization techniques are applied to facilitate feature engineering. Collectively, these techniques and feature engineering are referred to as featurization.
Note: Often, features are created from raw data through a process of feature engineering. For example, a time stamp in itself might not be useful for modeling until the information is transformed into units of days, months, or categories that are relevant to the problem, such as holiday versus working day.

Box 3: Feature selection -
In machine learning and statistics, feature selection is the process of selecting a subset of relevant, useful features to use in building an analytical model. Feature selection helps narrow the field of data to the most valuable inputs. Narrowing the field of data helps reduce noise and improve training performance.

Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/studio/evaluate-model-performance

https://docs.microsoft.com/en-us/azure/machine-learning/concept-automated-ml

Question 23:

HOTSPOT -
To complete the sentence, select the appropriate option in the answer area.
Hot Area:

Answer Area

Data values that influence the prediction of a model are called [▼]
- dependant variables.
- features.
- identifiers.
- labels.

Answer:

Answer Area

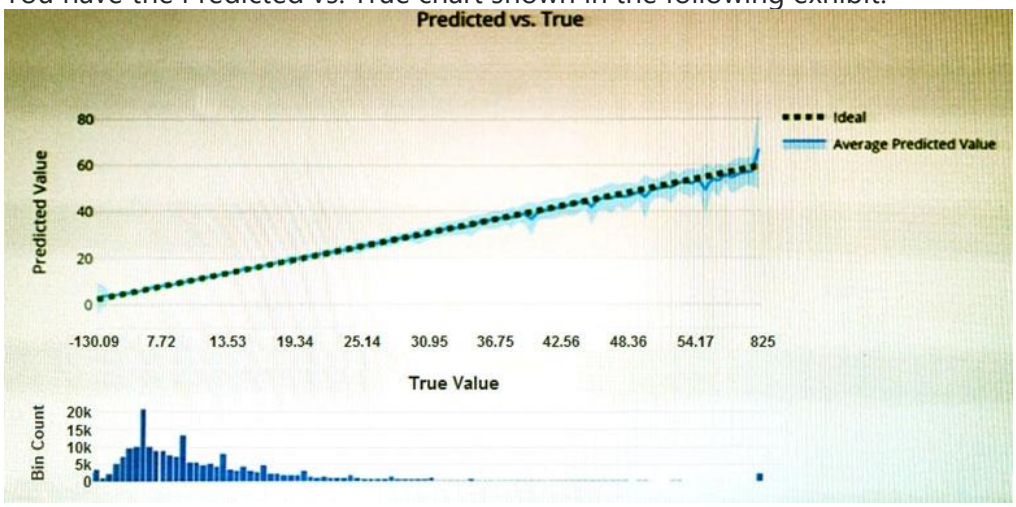
Data values that influence the prediction of a model are called [▼]
- dependant variables.
- features.
- identifiers.
- labels. ✓

Explanation:
In machine learning, if you have labeled data, that means your data is marked up, or annotated, to show the target, which is the answer you want your machine learning model to predict.
In general, data labeling can refer to tasks that include data tagging, annotation, classification, moderation, transcription, or processing.
Incorrect Answers:
Not features: In machine learning and statistics, feature selection is the process of selecting a subset of relevant, useful features to use in building an analytical model. Feature selection helps narrow the field of data to the most valuable inputs. Narrowing the field of data helps reduce noise and improve training performance.

Reference:
https://www.cloudfactory.com/data-labeling-guide

Question 24:

You have the Predicted vs. True chart shown in the following exhibit.



Which type of model is the chart used to evaluate?

- **A.** classification
- **B.** regression
- **C.** clustering

Answer : **B**

Explanation:
What is a Predicted vs. True chart?
Predicted vs. True shows the relationship between a predicted value and its correlating true value for a regression problem. This graph can be used to measure performance of a model as the closer to the y=x line the predicted values are, the better the accuracy of a predictive model.
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/how-to-understand-automated-m

Question 25:

Which type of machine learning should you use to predict the number of gift cards that will be sold next month?

- **A.** classification
- **B.** regression
- **C.** clustering

Answer : **C**

Explanation:
Clustering, in machine learning, is a method of grouping data points into similar clusters. It is also called segmentation.
Over the years, many clustering algorithms have been developed. Almost all clustering algorithms use the features of individual items to find similar items. For example, you might apply clustering to find similar people by demographics. You might use clustering with text analysis to group sentences with similar topics or sentiment.
Reference:
https://docs.microsoft.com/en-us/azure/machine-learning/studio-module-reference/machine-learning-initialize-model-clustering