

## Knowledge Checks

### Question 1

1.0/1.0 point (graded)

Which three statements characterize the difference between supervised learning, unsupervised learning and reinforcement learning?

- ☒ Supervised learning uses marked or known cases to train an algorithm to predict these cases correctly.
- ☒ Unsupervised learning attempts to find structure or relationships between cases in a data set without the need for marked cases.
- ☐ A reinforcement learning agent learns by measuring the error between predictions and known correct results in data cases.
- ☒ A reinforcement learning agent learns to interact with an environment and attempts to optimize its actions to maximize rewards received.
- ☐ Reinforcement learning seeks to reduce the dimensionality of the state information by averaging the error between the original state data and the encoding of that data.




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## Question 2

1.0/1.0 point (graded)

Which of the following examples is NOT a suitable reward function for reinforcement learning?

- ☐ A robot must pick up a component and place it in the correct position on a circuit board and receives a reward of 1 if this task is done correctly and -10 if the part is placed incorrectly, or if the robot strikes any of the other components on the circuit board.
- ☐ A tic-tac-toe player receives a reward of 1 for winning the game, and no reward for a tie or lost game.
- ☒ An agent is trained to drive a car using rules derived from the correct behavior of human drivers.  

- ☐ An agent must pick assets for a pension fund which must pay its benefits over time. The agent receives positive rewards for assets that appreciate more than a target return level and negative rewards for assets which do not achieve this performance.

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## Question 3

1.0/1.0 point (graded)

Which three features are absolutely required for a reinforcement learning agent?

- ☐ A method to mark the time of interactions with the environment.
- ☒ A way for the agent to sense the state of its environment.

☒ A reward function the agent can use to judge success in the task.

☐ Correctly marked cases to train the agent.

☐ A model of the environment the agent will interact with.

☒ A way for the agent to take actions in the environment.



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## Question 4

1.0/1.0 point (graded)

Which of the following is NOT a component of a reinforcement learning problem?

☐ The environment sends the information of reward to the agent.

☐ The agent decides to act based on certain policy.

☒ The agent determines which reward it should get based on its action.



☐ The environment sends the information of state to the agent.

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## Question 5

1.0/1.0 point (graded)

Which two of the following are good applications for reinforcement learning?

☐ An agent that discovers structure in data to reduce the dimensionality.

☒ Steering a self-driving car, where the reward is positive for arriving at a destination and negative for coming too close to obstacles, other vehicles, edges of driving lanes, or failure to obey traffic rules.

☒ A robot which sells refreshments to people waiting for an airplane flight a reward function that is positive for each person who buys a refreshment and negative for each passenger who does not buy anything.

☐ An inventory management agent that places orders for products that is trained using the history of demand for the products.



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## Question 6

1.0/1.0 point (graded)

Which of the following are differences between episodic tasks and continuing tasks?

☐ An episodic tasks run for a fixed number of time steps, whereas continuing tasks proceed for an infinite number of tasks.

☒ An episodic task has a terminal state, whereas the continuing task has no terminal state.



☐ An episodic task can only run once, whereas a continuing task runs indefinitely.

☐ An episodic task receives rewards at the end of each episode, whereas a continuous task can receives rewards at any time.


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## Question 7

1.0/1.0 point (graded)

Which of the following are episodic tasks?

- ☐ Playing a game of chess.
- ☐ An agent for a self-driving car which determines the route for each trip.
- ☐ A robot that places parts on assemblies in a factory.
- ☒ All of the above.  


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## Question 8

1.0/1.0 point (graded)

Which two of the following definitions of value functions are correct?

- ☐ A state value function maps the value of a particular action given the state.
- ☒ A state value function maps the state to the value of being in that state.
- ☒ A value-state function (action-state function) maps taking a particular action from a state to the value of that action from the state.

☐ A value-state function (action-state function) maps the value of a series of states.



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