Question

To model how long Amir will wait for a back-up using a continuous uniform distribution, save his lowest possible wait time as `min_time` and his longest possible wait time as `max_time`. Calculate specific waiting time probabilities using `scipy.stats.uniform`.

Explanation of the Question

This problem models Amir's waiting time for a backup, assumed to occur uniformly between 0 and 30 minutes. The task involves calculating probabilities for waiting less than 5 minutes, more than 5 minutes, and between 10 and 20 minutes.

Full Answer

```python
# Min and max wait times for back-up that happens every 30 minutes
min_time = 0
max_time = 30

# Import uniform from scipy.stats
from scipy.stats import uniform

# Calculate probability of waiting less than 5 minutes
prob_less_than_5 = uniform.cdf(5, loc=min_time, scale=max_time - min_time)
print("Probability Amir has to wait less than 5 minutes:", prob_less_than_5)

# Calculate probability of waiting more than 5 minutes
prob_greater_than_5 = 1 - prob_less_than_5
print("Probability Amir has to wait more than 5 minutes:", prob_greater_than_5)

# Calculate probability of waiting between 10 and 20 minutes
prob_between_10_and_20 = uniform.cdf(20, loc=min_time, scale=max_time - min_time) - uniform.cdf(10, loc=min_time, scale=max_time - min_time)
print("Probability Amir has to wait between 10 and 20 minutes:", prob_between_10_and_20)
```

Explanation of the Answer

The code uses a continuous uniform distribution to model Amir's waiting times between 0 and 30 minutes. It calculates probabilities using cumulative distribution functions (CDFs) for specific intervals, enabling precise probability computation for less than 5 minutes, more than 5 minutes, and between 10 and 20 minutes.