

Question

The sales software used at your company is set to automatically back itself up, but no one knows exactly what time the back-ups happen. It is known, however, that back-ups happen exactly every 30 minutes. Amir comes back from sales meetings at random times to update the data on the client he just met with. He wants to know how long he'll have to wait for his newly-entered data to get backed up. Use your knowledge of continuous uniform distributions to model this situation and answer Amir's questions.

Explanation of the Question

This problem involves modeling a continuous uniform distribution, as the backup system triggers backups every 30 minutes. Amir's arrival time is random, so his wait time for the next backup is uniformly distributed between 0 and 30 minutes.

Correct Answer

```
# Define the minimum and maximum time for backups
min_time = 0
max_time = 30

# Importing uniform from scipy.stats
from scipy.stats import uniform

# Calculate probability that Amir has to wait less than 5 minutes
prob_less_than_5 = uniform.cdf(5, loc=min_time, scale=max_time -
min_time)

# Calculate probability that Amir has to wait more than 5 minutes
prob_greater_than_5 = 1 - prob_less_than_5

# Calculate probability that Amir has to wait 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 results
print("Probability Amir has to wait less than 5 minutes:", prob_less_than_5)
```

```
print("Probability Amir has to wait more than 5 minutes:",  
      prob_greater_than_5)  
print("Probability Amir has to wait between 10 and 20 minutes:",  
      prob_between_10_and_20)
```

Explanation of the Answer

The uniform distribution is used because backup times are uniformly distributed between 0 and 30 minutes. The cumulative distribution function (CDF) of the uniform distribution calculates the probabilities. Differences in CDF values yield probabilities for specific intervals.