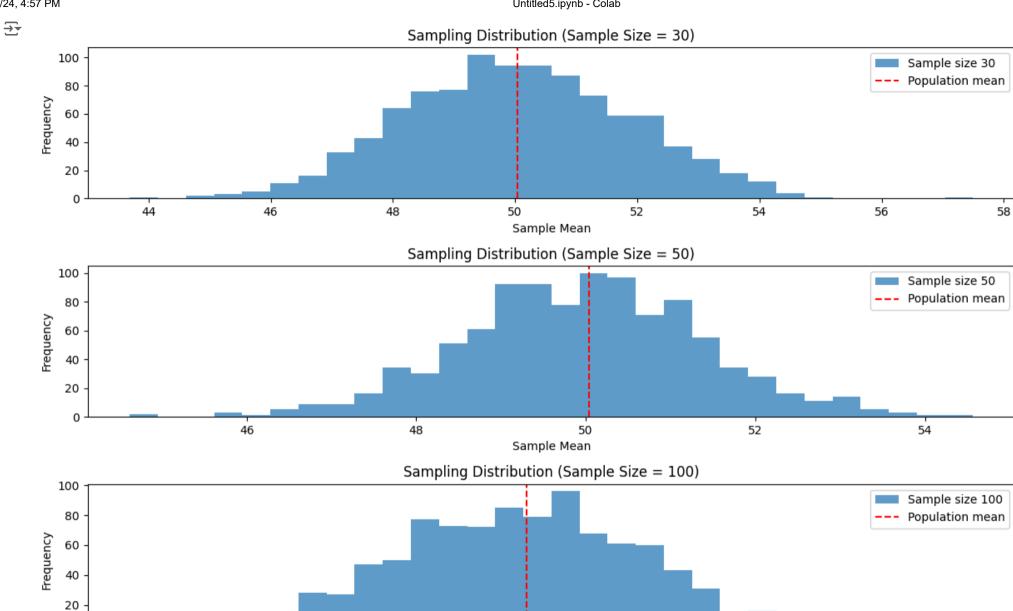
```
Start coding or generate with AI.
import numpy as np
import matplotlib.pyplot as plt
# Parameters for the population
population mean = 50
population std = 10
population size = 100000
# Generate the population
population = np.random.normal(population mean, population std, population size)
# Define sample sizes and number of samples
sample sizes = [30, 50, 100]
num samples = 1000
# Dictionary to store sample means
sample means = {size: [] for size in sample sizes}
# Generate sampling distributions
for size in sample_sizes:
    for _ in range(num_samples):
        sample = np.random.choice(population, size=size, replace=False)
        sample means[size].append(np.mean(sample))
# Plotting the histograms
plt.figure(figsize=(12, 8))
for i, size in enumerate(sample sizes, start=1):
    plt.subplot(len(sample sizes), 1, i)
    plt.hist(sample_means[size], bins=30, alpha=0.7, label=f'Sample size {size}')
    plt.axvline(np.mean(population), color='red', linestyle='dashed', linewidth=1.5, label='Population mean')
    plt.title(f'Sampling Distribution (Sample Size = {size})')
    plt.xlabel('Sample Mean')
    plt.ylabel('Frequency')
    plt.legend()
plt.tight_layout()
plt.show()
```

11/21/24, 4:57 PM Untitled5.ipynb - Colab



Sample Mean