```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm, uniform, beta

# Observed average weight (kg)
observed_weight = 70

# Range of possible mean weights
mu_values = np.linspace(60, 80, 100)

# Priors
prior_uniform = uniform.pdf(mu_values, 60, 20)
prior_beta = beta.pdf((mu_values - 60) / 20, 2, 5)

# Likelihood
sigma = 5
likelihood = norm.pdf(observed_weight, mu_values, sigma)

# Posterior (normalized)
posterior_uniform = (prior_uniform * likelihood) / np.sum(prior_uniform * likelihood)
posterior_beta = (prior_beta * likelihood) / np.sum(prior_beta * likelihood)

# Plot
plt.figure(figsize=(10, 6))
plt.plot(mu_values, prior_uniform, '--', label='Uniform Prior')
plt.plot(mu_values, prior_beta, '--', label='Beta Prior')
plt.plot(mu_values, likelihood, '-.', label='Likelihood')
plt.plot(mu_values, posterior_uniform, label='Posterior (Uniform Prior)')
plt.plot(mu_values, posterior_beta, label='Posterior (Beta Prior)')
plt.title("Bayesian Estimation: Mean Weight")
plt.xlabel("Weight (kg)")
plt.ylabel("Probability Density")
plt.legend()
plt.grid(True)
plt.show()
```

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm, uniform, beta

# Observed score
observed_score = 85

# Range of possible scores
mu_values = np.linspace(70, 100, 100)

# Priors
prior_uniform = uniform.pdf(mu_values, 70, 30)
prior_beta = beta.pdf((mu_values - 70) / 30, 5, 2)

# Likelihood
sigma = 5
likelihood = norm.pdf(observed_score, mu_values, sigma)

# Posterior (normalized)
posterior_uniform = (prior_uniform * likelihood) / np.sum(prior_uniform * likelihood)
posterior_beta = (prior_beta * likelihood) / np.sum(prior_beta * likelihood)

# Plot
plt.figure(figsize=(10, 6))
plt.plot(mu_values, prior_uniform, '--', label='Uniform Prior')
plt.plot(mu_values, prior_beta, '--', label='Beta Prior')
plt.plot(mu_values, likelihood, '-.', label='Likelihood')
plt.plot(mu_values, posterior_uniform, label='Posterior (Uniform Prior)')
plt.plot(mu_values, posterior_beta, label='Posterior (Beta Prior)')
plt.title("Bayesian Estimation: Exam Score")
plt.xlabel("Score")
plt.ylabel("Probability Density")
plt.legend()
plt.grid(True)
plt.show()
```

```
import numpy as np
import matplotlib.pyplot as plt
from scipy.stats import norm, uniform, beta

# Observed height in meters
observed_height = 1.75

# Range of possible mean heights
mu_values = np.linspace(1.65, 1.85, 100)

# Priors
prior_uniform = uniform.pdf(mu_values, 1.65, 0.2)
prior_beta = beta.pdf((mu_values - 1.65) / 0.2, 3, 4)

# Likelihood
sigma = 0.1
likelihood = norm.pdf(observed_height, mu_values, sigma)

# Posterior (normalized)
posterior_uniform = (prior_uniform * likelihood) / np.sum(prior_uniform * likelihood)
posterior_beta = (prior_beta * likelihood) / np.sum(prior_beta * likelihood)

# Plot
plt.figure(figsize=(10, 6))
plt.plot(mu_values, prior_uniform, '--', label='Uniform Prior')
plt.plot(mu_values, prior_beta, '--', label='Beta Prior')
plt.plot(mu_values, likelihood, '-.', label='Likelihood')
plt.plot(mu_values, posterior_uniform, label='Posterior (Uniform Prior)')
plt.plot(mu_values, posterior_beta, label='Posterior (Beta Prior)')
plt.title("Bayesian Estimation: Mean Height (New Observation)")
plt.xlabel("Height (m)")
plt.ylabel("Probability Density")
plt.legend()
plt.grid(True)
plt.show()
```