1. The common fruit fly Drosophila melanogaster is the most studied organism in genetic research because it is small, easy to grow, and reproduces rapidly. The length of the thorax (where the wings and legs attach) in a population of male fruit flies is approximately Normal with mean $\mu = 0.8$ millimeters (mm) and standard deviation $\sigma = 0.078$ mm.

Suppose we take repeated random samples of $n = 39$ and record the mean $\bar{x}$ for each sample. What is the approximate distribution of the sample means $\bar{x}$?

A. The sample means $\bar{x}$ have an approximately normal distribution $N(0.793, 0.0118)$.

B. The sample means $\bar{x}$ have an approximately normal distribution $N(0.8, 0.0125)$.

C. The sample means $\bar{x}$ have an approximately normal distribution $N(0.8, 0.0106)$.

D. The sample means $\bar{x}$ have an approximately normal distribution $N(0.7974, 0.0118)$.

E. The sample means $\bar{x}$ have an approximately normal distribution $N(0.8, 0.0122)$.

F. The sample means $\bar{x}$ have an approximately normal distribution $N(0.7974, 0.0122)$.

G. The sample means $\bar{x}$ have an approximately normal distribution $N(0.793, 0.0106)$.

H. The sample means $\bar{x}$ have an approximately normal distribution $N(0.793, 0.0125)$.

2. Suppose a random variable X has a distribution with mean $\mu = 6.8$ and standard deviation $\sigma = 3.9$.

Suppose we take a random sample of $n = 50$ outcomes of X and record the mean $\bar{x}$.

Find $P(\bar{x} < 6.606)$.

A. $P(\bar{x} < 6.606) = 0.4252$.

B. $P(\bar{x} < 6.606) = 0.3632$.

C. $P(\bar{x} < 6.606) = 0.5612$.

D. $P(\bar{x} < 6.606) = 0.2592$.

E. $P(\bar{x} < 6.606) = 0.5332$.

F. $P(\bar{x} < 6.606) = 0.1852$.

G. $P(\bar{x} < 6.606) = 0.1972$.

H. $P(\bar{x} < 6.606) = 0.2292$.

3. A geyser in Jellystone National Park named "Old Fateful" goes off at regular intervals. The time between consecutive eruptions X is uniformly distributed between 42 and 122 minutes.

Suppose we take a random sample of $n = 39$ times between eruptions. What is the approximate probability that the sample mean $\bar{x}$ will be greater than 83.603 minutes?

A. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.4656.

B. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.2296.

C. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.5216.

D. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.1796.

E. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.4376.

F. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.3336.

G. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.4456.

H. The probability that $\bar{x}$ will be greater than 83.603 minutes is approximately 0.2216.

4. The common fruit fly Drosophila melanogaster is the most studied organism in genetic research because it is small, easy to grow, and reproduces rapidly. The length of the thorax (where the wings and legs attach) in a population of male fruit flies is approximately Normal with mean $\mu = 0.8$ millimeters (mm) and standard deviation $\sigma = 0.078$ mm.

Suppose we take a random sample of $n = 74$ fruit flies. What is the approximate probability that the sample mean $\bar{x}$ will be between 0.793 mm and 0.814 mm?

A. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.8156.

B. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.7176.

C. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.9136.

D. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.7956.

E. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.6416.

F. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.5556.

G. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.8496.

H. The probability that $\bar{x}$ will be between 0.793 mm and 0.814 mm is approximately 0.6576.

5. The life of car batteries are well-approximated by an exponential distribution. Depending on the quality of manufacture, a car battery has a mean lifespan of anywhere between 4 and 6 years.

Suppose a brand of car battery has a mean lifespan of $\mu = 4.4$ years.

Suppose we take repeated random samples of $n = 33$ batteries and record the mean $\bar{x}$ for each sample. What is the approximate distribution of of the sample means $\bar{x}$?

A. The sample means $\bar{x}$ have an approximately exponential distribution Exp(4.44).

B. The sample means $\bar{x}$ have an approximately normal distribution $N(4.44, 0.7699)$.

C. The sample means $\bar{x}$ have an approximately normal distribution $N(4.4, 0.7659)$.

D. The sample means $\bar{x}$ have an approximately normal distribution $N(4.4, 0.6539)$.

E. The sample means $\bar{x}$ have an approximately normal distribution $N(2.94, 0.6199)$.

F. The sample means $\bar{x}$ have an approximately exponential distribution Exp(0.2273).

G. The sample means $\bar{x}$ have an approximately exponential distribution Exp(0.2313).

H. The sample means $\bar{x}$ have an approximately exponential distribution Exp(4.4).

6. The heights of women aged 20 to 29 are approximately Normal with mean $\mu = 64.3$ inches and standard deviation $\sigma = 2.7$ inches.

Suppose we take a random sample of $n = 87$ women and measure their heights. What is the approximate probability that the sample mean $\bar{x}$ will be between 63.807 inches and 64.117 inches?

A. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.2138.

B. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.0378.

C. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.1598.

D. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.0238.

E. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.3738.

F. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.2298.

G. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.1378.

H. The probability that $\bar{x}$ will be between 63.807 inches and 64.117 inches is approximately 0.2198.

7. The common fruit fly Drosophila melanogaster is the most studied organism in genetic research because it is small, easy to grow, and reproduces rapidly. The length of the thorax (where the wings and legs attach) in a population of male fruit flies is approximately Normal with mean $\mu = 0.8$ millimeters (mm) and standard deviation $\sigma = 0.078$ mm.

Suppose we take a random sample of $n = 91$ fruit flies. What is the approximate probability that the sample mean $\bar{x}$ will be greater than 0.784 mm?

A. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.781.

B. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.871.

C. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.965.

D. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.951.

E. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.877.

F. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.963.

G. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.975.

H. The probability that $\bar{x}$ will be greater than 0.784 mm is approximately 0.867.

8. The heights of women aged 20 to 29 are approximately Normal with mean $\mu = 64.3$ inches and standard deviation $\sigma = 2.7$ inches.

Suppose we take a random sample of $n = 61$ women and measure their heights. What is the approximate probability that the sample mean $\bar{x}$ will be greater than 64.632 inches?

A. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.2905.

B. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.2525.

C. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.0765.

D. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.2665.

E. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.1805.

F. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.0725.

G. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.1685.

H. The probability that $\bar{x}$ is greater than 64.632 inches is approximately 0.2145.