1. The value given below is discrete. Use the continuity correction and describe the region of the normal distribution that corresponds to the indicated probability.

   Probability of more than 6 Senators who are women

   Choose the correct answer below.

   ○A. The area to the right of 5.5

   ○B. The area between 5.5 and 6.5

   ○C. The area to the right of 6.5

   ○D. The area to the left of 6.5

   ○E. The area to the left of 5.5

2. Find the indicated IQ score. The graph to the right depicts IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15.
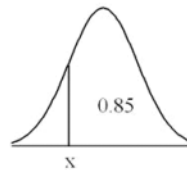
   The indicated IQ score, x, is ☐. (Round to one decimal place as needed.)

3. Find the area of the shaded region. The graph to the right depicts IQ scores of adults, and those scores are normally distributed with a mean of 100 and a standard deviation of 15.
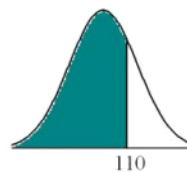
   The area of the shaded region is ☐. (Round to four decimal places as needed.)

4. A safety light is designed so that the times between flashes are normally distributed with a mean of 5.00 s and a standard deviation of 0.60 s.
a. Find the probability that an individual time is greater than 5.50 s.
b. Find the probability that the mean for 70 randomly selected times is greater than 5.50 s.
c. Given that the light is intended to help people see an obstruction, which result is more relevant for assessing the safety of the light?

a. The probability is approximately ☐. (Round to four decimal places as needed.)

b. The probability is approximately ☐. (Round to four decimal places as needed.)

c. Choose the correct answer below.

○A. Part (b) is more significant because the times of a single strobe is important.

○B. Part (a) is more significant because the average time for a sample is important.

○C. Part (a) is more significant because the times of a single strobe is important.

○D. Part (b) is more significant because the average time for a sample is important.
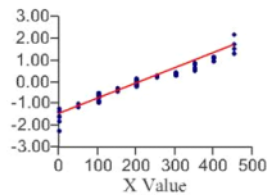
5. Use a calculator or computer software to generate a normal quantile plot for the data in the accompanying table. Then determine whether the data come from a normally distributed population.
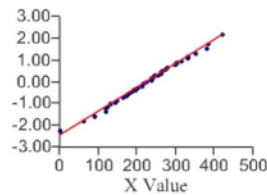
    ▭ Click the icon to view the data set.

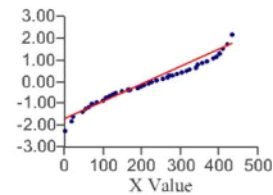   Generate a normal quantile plot for the data. Choose the correct graph below.

    ○ A.
    ○ B.
    ○ C.

    Determine whether the data come from a normally distributed population. Choose the correct answer below.

    ○ A. The distribution is not normal. The points show a systematic pattern that is not a straight-line pattern.

    ○ B. The distribution is normal. The points show a systematic pattern that is not a straight-line pattern.

    ○ C. The distribution is normal. The points are reasonably close to a straight line and do not show a systematic pattern that is not a straight-line pattern.

    ○ D. The distribution is not normal. The points are not reasonably close to a straight line.

    Data Table

    Space Flight Durations (hours) ▭

338	22	252	105	302	15	224	313	270	185
121	382	420	196	275	98	432	164	71	397
289	217	63	2	43	342	263	148	355	80
54	132	203	366	114	408	168	389	235	321

6. Three randomly selected households are surveyed. The numbers of people in the households are 1, 3, and 8. Assume that samples of size $n = 2$ are randomly selected with replacement from the population of 1, 3, and 8. Listed below are the nine different samples. Complete parts (a) through (c).

   1,1   1,3   1,8   3,1   3,3   3,8   8,1   8,3   8,8

   a. Find the median of each of the nine samples, then summarize the sampling distribution of the medians in the format of a table representing the probability distribution of the distinct median values.

Sample Median	Probability
▾	☐
▾	☐
▾	☐
▾	☐
▾	☐
▾	☐

   (Type integers or fractions. Use ascending order of the sample medians.)

   b. Compare the population median to the mean of the sample medians. Choose the correct answer below.

   ○ A. The population median is equal to the mean of the sample medians.

   ○ B. The population median is equal to double the mean of the sample medians.

   ○ C. The population median is not equal to the mean of the sample medians (it is also not half or double the mean of the sample medians).

   ○ D. The population median is equal to half of the mean of the sample medians.

   c. Do the sample medians target the value of the population median? In general, do sample medians make good estimators of population medians? Why or why not?

   ○ A. The sample medians do not target the population median, so sample medians make good estimators of population medians.

   ○ B. The sample medians do not target the population median, so sample medians do not make good estimators of population medians.

   ○ C. The sample medians target the population median, so sample medians make good estimators of population medians.

   ○ D. The sample medians target the population median, so sample medians do not make good estimators of population medians.

7. Assume that adults have IQ scores that are normally distributed with a mean of 100 and a standard deviation 15. Find P_9, which is the IQ score separating the bottom 9% from the top 91%.

   The IQ score that separates the bottom 9% from the top 91% is $P_9 = $ ☐ .
   (Round to the nearest hundredth as needed.)

8. Assume the readings on thermometers are normally distributed with a mean of 0°C and a standard deviation of 1.00°C. Find the probability $P(-1.38 < z < 1.38)$, where z is the reading in degrees.

$P(-1.38 < z < 1.38) = \boxed{}$
(Round to four decimal places as needed.)

9. If you select a simple random sample of M&M plain candies and construct a normal quantile plot of their weights, what pattern would you expect in the graphs?

Choose the correct answer below.

○A. Not reasonably close to a straight line.

○B. A systematic pattern that is not a straight line.

○C. Approximately a straight line.

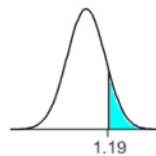10. Assume the readings on thermometers are normally distributed with a mean of 0°C and a standard deviation of 1.00°C. Find the probability that a randomly selected thermometer reads greater than 1.19 and draw a sketch of the region.

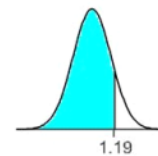Sketch the region. Choose the correct graph below.

○A.

-1.19

○B.

1.19

○C.

1.19
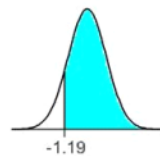
The probability is $\boxed{}$.
(Round to four decimal places as needed.)

11. Women's heights are normally distributed with mean 63.7 in and standard deviation of 2.5 in. A social organization for tall people has a requirement that women must be at least 70 in tall. What percentage of women meet that requirement?

The percentage of women that are taller than 70 in is $\boxed{}$%.
(Round to two decimal places as needed.)

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12. An airliner carries 100 passengers and has doors with a height of 72 in. Heights of men are normally distributed with a mean of 69.0 in and a standard deviation of 2.8 in. Complete parts (a) through (d).

a. If a male passenger is randomly selected, find the probability that he can fit through the doorway without bending.

The probability is ☐ .
(Round to four decimal places as needed.)

b. If half of the 100 passengers are men, find the probability that the mean height of the 50 men is less than 72 in.

The probability is ☐ .
(Round to four decimal places as needed.)

c. When considering the comfort and safety of passengers, which result is more relevant: the probability from part (a) or the probability from part (b)? Why?

- ○A. The probability from part (b) is more relevant because it shows the proportion of flights where the mean height of the male passengers will be less than the door height.
- ○B. The probability from part (b) is more relevant because it shows the proportion of male passengers that will not need to bend.
- ○C. The probability from part (a) is more relevant because it shows the proportion of flights where the mean height of the male passengers will be less than the door height.
- ○D. The probability from part (a) is more relevant because it shows the proportion of male passengers that will not need to bend.

d. When considering the comfort and safety of passengers, why are women ignored in this case?

- ○A. Since men are generally taller than women, a design that accommodates a suitable proportion of men will necessarily accommodate a greater proportion of women.
- ○B. Since men are generally taller than women, it is more difficult for them to bend when entering the aircraft. Therefore, it is more important that men not have to bend than it is important that women not have to bend.
- ○C. There is no adequate reason to ignore women. A separate statistical analysis should be carried out for the case of women.

13. The ages (years) of three government officials when they died in office were 56, 45, and 60. Complete parts (a) through (d).

a. Assuming that 2 of the ages are randomly selected with replacement, list the different possible samples.

○ A. (56,56), (56,45),(56,60),(45,45),(45,60),(60,60)

○ B. (56,56), (56,45),(56,60),(45,56),(45,45),(45,60),(60,56),(60,45),(60,60)

○ C. (56,45),(56,60),(45,60)

○ D. (56,45),(56,60),(45,56),(45,60),(60,56),(60,45)

b. Find the range of each of the samples, then summarize the sampling distribution of the ranges in the format of a table representing the probability distribution.

Sample Range   Probability

[▼]   □

_____

[▼]   □

_____

[▼]   □

_____

[▼]   □

_____

(Type an integer or a fraction.)

c. Compare the population range to the mean of the sample ranges. Choose the correct answer below.

○ A. The population range is equal to the age of the oldest official at the time of death and the mean of the sample ranges is equal to the youngest official at the time of death.

○ B. The population range is equal to the mean of the sample ranges.

○ C. The population range is equal to the youngest official at the time of death and the mean of the sample ranges is equal to the oldest official at the time of death.

○ D. The population range is not equal to the mean of the sample ranges (it is also not equal to the age of the oldest official or age of the youngest official at the time of death).

d. Do the sample ranges target the value of the population range? In general, do sample ranges make good estimators of population ranges? Why or why not?

13.
(cont.)

○A. The sample ranges do not target the population range, therefore, sample ranges make good estimators of population ranges.

○B. The sample ranges do not target the population range, therefore, sample ranges do not make good estimators of population ranges.

○C. The sample ranges target the population range, therefore, sample ranges do not make good estimators of population ranges.

○D. The sample ranges target the population range, therefore, sample ranges make good estimators of population ranges.

14.

Find the area of the shaded region. The graph depicts the standard normal distribution with mean 0 and standard deviation 1.
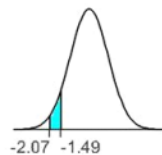

z=0.12
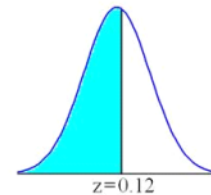
The area of the shaded region is ☐ .
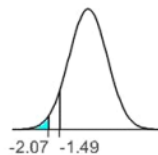(Round to four decimal places as needed.)

15.

Assume the readings on thermometers are normally distributed with a mean of 0°C and a standard deviation of 1.00°C. Find the probability that a randomly selected thermometer reads between -2.07 and -1.49 and draw a sketch of the region.
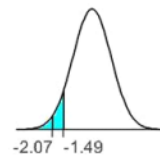
Sketch the region. Choose the correct graph below.

○A.

-2.07 -1.49

○B.

-2.07 -1.49

○C.

-2.07 -1.49

The probability is ☐ .
(Round to four decimal places as needed.)

16. What requirements are necessary for a normal probability distribution to be a *standard* normal probability distribution?
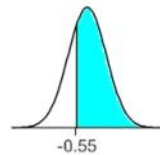
Choose the correct answer below.

○ A. The mean and standard deviation have the values of $\mu = 0$ and $\sigma = 0$.

○ B. The mean and standard deviation have the values of $\mu = 1$ and $\sigma = 1$.

○ C. The mean and standard deviation have the values of $\mu = 0$ and $\sigma = 1$.

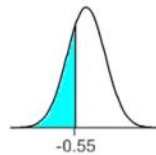○ D. The mean and standard deviation have the values of $\mu = 1$ and $\sigma = 0$.

17. Assume the readings on thermometers are normally distributed with a mean of 0°C and a standard deviation of 1.00°C. Find the probability that a randomly selected thermometer reads greater than -0.55 and draw a sketch of the region.

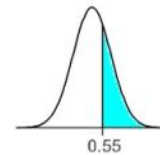Sketch the region. Choose the correct graph below.

○ A.   ○ B.   ○ C.

The probability is ☐ .
(Round to four decimal places as needed.)

18. What is the standard error of the mean?

Choose the correct answer below.

○ A. The mean of the sample means.

○ B. The range of the sample means.

○ C. The standard deviation of the sample means.

○ D. The variance of the sample means.

19. (a) With $n = 11$ and $p = 0.7$, find the binomial probability P(9) by using a binomial probability table. (b) If $np \geq 5$ and $nq \geq 5$, also estimate the indicated probability by using the normal distribution as an approximation to the binomial.

(a) Find the probability by using a binomial probability table.

P(9) = ☐
(Round to three decimal places as needed.)

(b) Estimate the probability using the normal distribution. If the normal distribution cannot be used to approximate this probability, then enter 'N'.

P(9) = ☐
(Round to four decimal places as needed.)

20. Assume that human body temperatures are normally distributed with a mean of 98.21°F and a standard deviation of 0.64°F.
a. A hospital uses 100.6°F as the lowest temperature considered to be a fever. What percentage of normal and healthy persons would be considered to have a fever? Does this percentage suggest that a cutoff of 100.6°F is appropriate?
b. Physicians want to select a minimum temperature for requiring further medical tests. What should that temperature be, if we want only 5.0% of healthy people to exceed it? (Such a result is a false positive, meaning that the test result is positive, but the subject is not really sick.)

a. The percentage of normal and healthy persons considered to have a fever is ☐ %.
(Round to two decimal places as needed.)

Does this percentage suggest that a cutoff of 100.6°F is appropriate?

○A. No, because there is a large probability that a normal and healthy person would be considered to have a fever.

○B. No, because there is a small probability that a normal and healthy person would be considered to have a fever.

○C. Yes, because there is a large probability that a normal and healthy person would be considered to have a fever.

○D. Yes, because there is a small probability that a normal and healthy person would be considered to have a fever.

b. The minimum temperature for requiring further medical tests should be ☐ °F if we want only 5.0% of healthy people to exceed it.
(Round to two decimal places as needed.)

1. C

2. 84.4

3. 0.7486

4. 0.2023
    0.0000
    C

5. C
    A

6. 1
    1 / 9
    2
    2 / 9
    3
    1 / 9
    4.5
    2 / 9
    5.5
    2 / 9
    8
    1 / 9
    C
    B

7. 79.90

8. 0.8324

9. C

10. B
    0.1170

11. 0.59

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12. 0.8580
    1.0000
    D
    A

13. B
    0

    $\dfrac{3}{9}$

    4

    $\dfrac{2}{9}$

    11

    $\dfrac{2}{9}$

    15

    $\dfrac{2}{9}$

    D
    B

14. 0.5478

15. A
    0.0489

16. C

17. A
    0.7088

18. C

19. 0.200
    N

20. 0.01
    D
    99.26

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