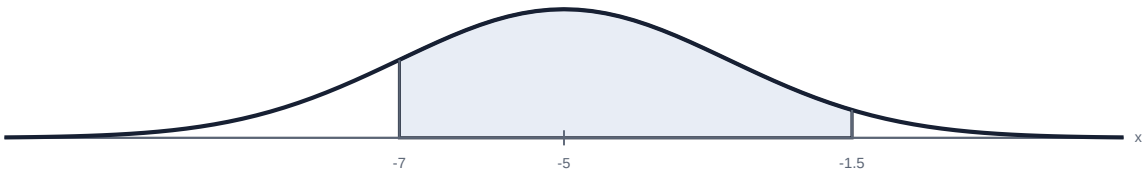
Name _____ Score _____ Teacher _____ Date _____

Normal Distribution

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

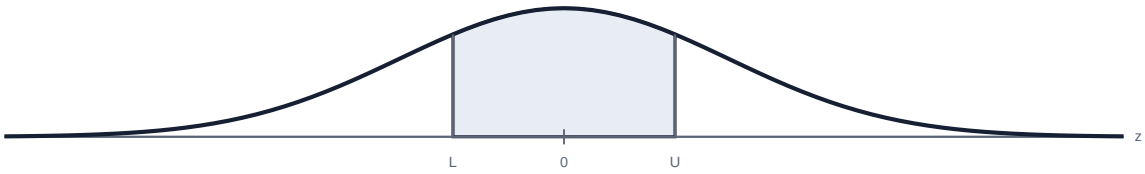
1. X is normal with mean -5 and standard deviation 2. Find P(-7 < X < -1.5).

Provided normal-CDF values: Phi(-1) = 0.158655261; Phi(1.75) = 0.959940845.



2. X is normal with mean 0 and standard deviation 1. Find the symmetric central interval [L, U] containing probability 0.5. Round endpoints to two decimal places.

Provided inverse-normal value: Phi^-1(0.75) = 0.674490; symmetry gives the lower z value.



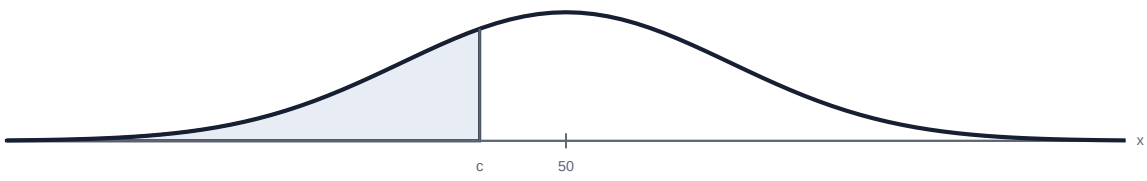
Name _____ Score _____ Teacher _____ Date _____

Normal Distribution

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

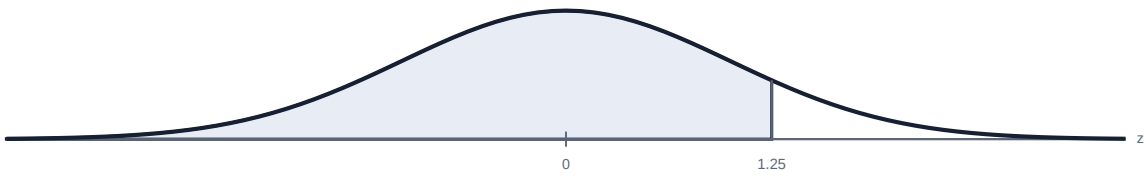
3. **X is normal with mean 50 and standard deviation 4. Find cutoff c such that P(X <= c) = 0.3. Round c to two decimal places.**

Provided inverse-normal value: Phi^-1(0.3) = -0.524400.



4. **X is normal with mean 0 and standard deviation 1. Find P(X < 1.25).**

Provided normal-CDF value: Phi(1.25) = 0.894350220.



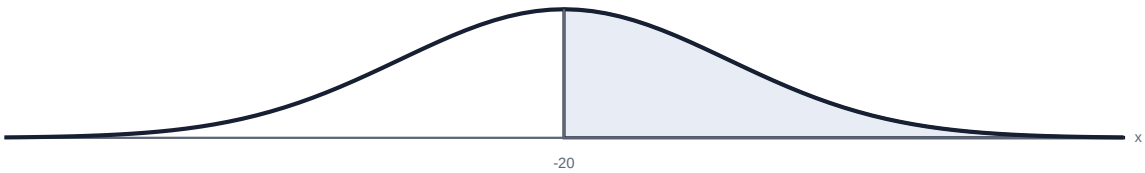
Name _____ Score _____ Teacher _____ Date _____

Normal Distribution

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

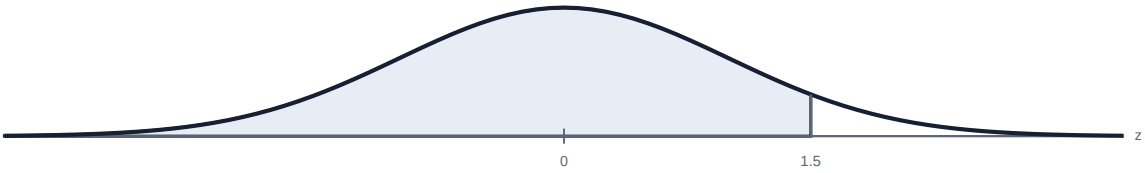
5. **X is normal with mean -20 and standard deviation 4. Find P(X > -20).**

Provided normal-CDF value: Phi(0) = 0.499999985.



6. **X is normal with mean 0 and standard deviation 1. Find P(X < 1.5).**

Provided normal-CDF value: Phi(1.5) = 0.933192798.



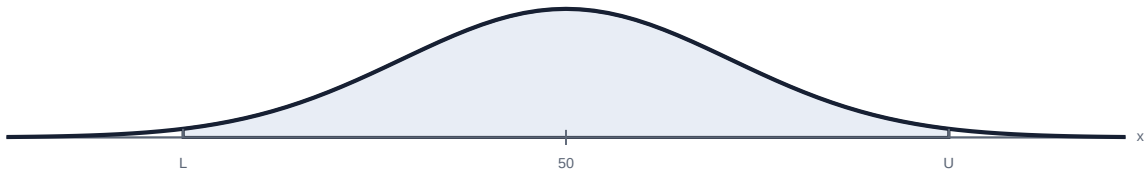
Name _____ Score _____ Teacher _____ Date _____

Normal Distribution

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

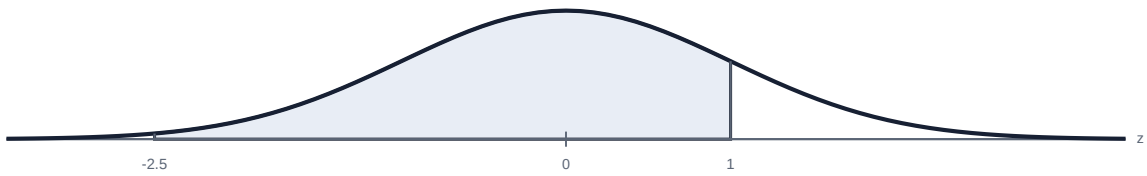
7. **X is normal with mean 50 and standard deviation 2. Find the symmetric central interval [L, U] containing probability 0.98. Round endpoints to two decimal places.**

Provided inverse-normal value: Phi^-1(0.99) = 2.326348; symmetry gives the lower z value.



8. **X is normal with mean 0 and standard deviation 1. Find P(-2.5 < X < 1).**

Provided normal-CDF values: Phi(-2.5) = 0.006209665; Phi(1) = 0.841344739.



Name _____ Score _____ Teacher _____ Date _____

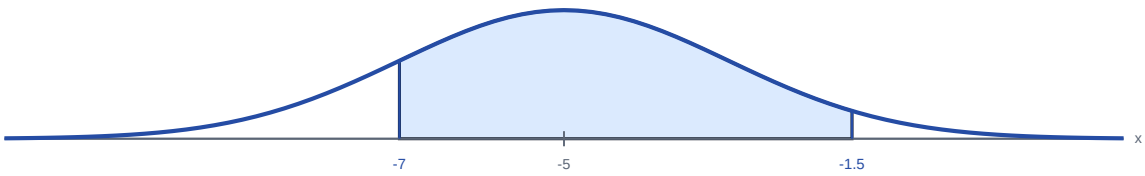
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

1. X is normal with mean -5 and standard deviation 2. Find P(-7 < X < -1.5).

Provided normal-CDF values: Phi(-1) = 0.158655261; Phi(1.75) = 0.959940845.

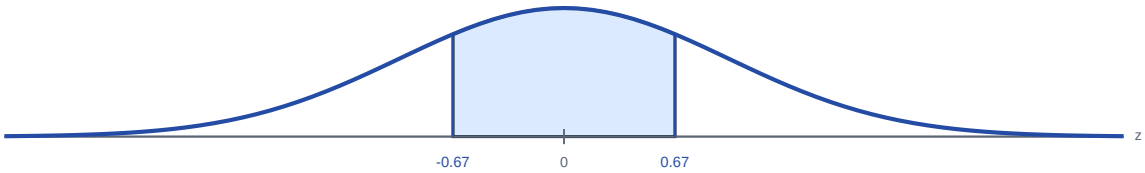


Answer: approximately 0.8013

1. z_lower = (-7 - -5) / 2 = -1; z_upper = (-1.5 - -5) / 2 = 1.75.
2. P(-7 < X < -1.5) = Phi(1.75) - Phi(-1) = 0.8013.

2. X is normal with mean 0 and standard deviation 1. Find the symmetric central interval [L, U] containing probability 0.5. Round endpoints to two decimal places.

Provided inverse-normal value: Phi^-1(0.75) = 0.674490; symmetry gives the lower z value.



Answer: [-0.67, 0.67]

1. Each tail has probability (1 - 0.5) / 2 = 0.25; the upper cumulative probability is 0.75.
2. z_upper = Phi^-1(0.75) = 0.674490 and z_lower = -0.674490.
3. L = 0 - (0.674490)(1) = -0.67; U = 0 + (0.674490)(1) = 0.67.

Name _____ Score _____ Teacher _____ Date _____

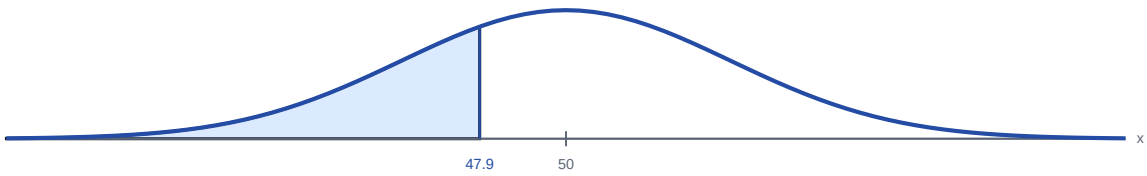
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

3. X is normal with mean 50 and standard deviation 4. Find cutoff c such that P(X <= c) = 0.3. Round c to two decimal places.

Provided inverse-normal value: Phi^-1(0.3) = -0.524400.

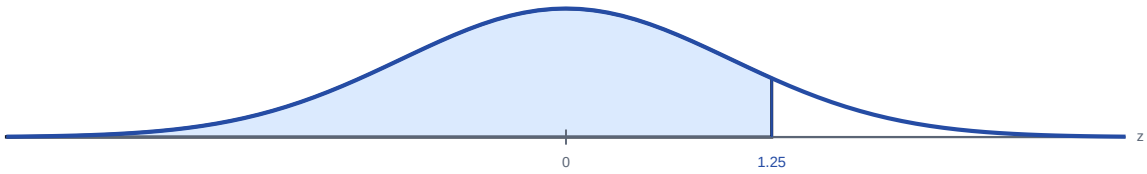


Answer: c approximately 47.90

1. z = Phi^-1(0.3) = -0.524400.
2. c = mean + z(standard deviation) = 50 + (-0.524400)(4) = 47.90.

4. X is normal with mean 0 and standard deviation 1. Find P(X < 1.25).

Provided normal-CDF value: Phi(1.25) = 0.894350220.



Answer: approximately 0.8944

1. z = (1.25 - 0) / 1 = 1.25.
2. P(X < 1.25) = Phi(1.25) = 0.8944.

Name _____ Score _____ Teacher _____ Date _____

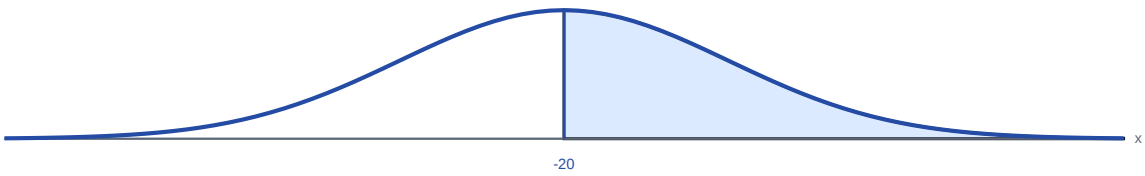
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

5. **X is normal with mean -20 and standard deviation 4. Find P(X > -20).**

Provided normal-CDF value: Phi(0) = 0.499999985.

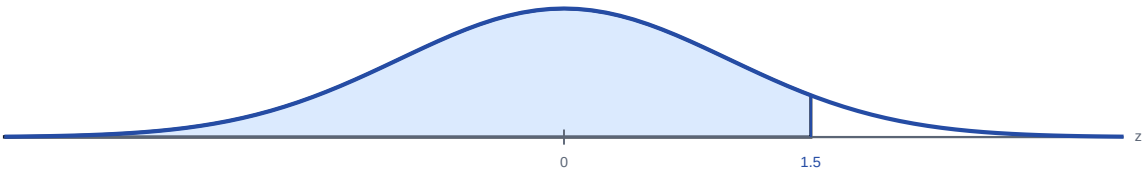


Answer: approximately 0.5000

1. z = (-20 - -20) / 4 = 0.
2. P(X > -20) = 1 - Phi(0) = 0.5000 (computed with the upper tail to avoid cancellation).

6. **X is normal with mean 0 and standard deviation 1. Find P(X < 1.5).**

Provided normal-CDF value: Phi(1.5) = 0.933192798.



Answer: approximately 0.9332

1. z = (1.5 - 0) / 1 = 1.5.
2. P(X < 1.5) = Phi(1.5) = 0.9332.

Name _____ Score _____ Teacher _____ Date _____

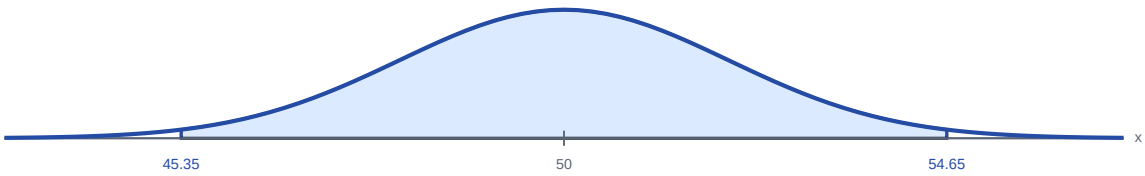
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with z = (x - mean) / standard deviation. Use the supplied reference values or the labeled calculator method. Round probabilities to four decimal places and percentile cutoffs to two decimal places.

7. X is normal with mean 50 and standard deviation 2. Find the symmetric central interval [L, U] containing probability 0.98. Round endpoints to two decimal places.

Provided inverse-normal value: Phi^-1(0.99) = 2.326348; symmetry gives the lower z value.

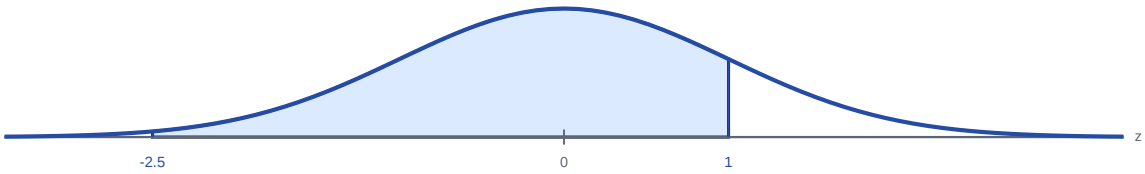


Answer: [45.35, 54.65]

1. Each tail has probability (1 - 0.98) / 2 = 0.01; the upper cumulative probability is 0.99.
2. z_upper = Phi^-1(0.99) = 2.326348 and z_lower = -2.326348.
3. L = 50 - (2.326348)(2) = 45.35; U = 50 + (2.326348)(2) = 54.65.

8. X is normal with mean 0 and standard deviation 1. Find P(-2.5 < X < 1).

Provided normal-CDF values: Phi(-2.5) = 0.006209665; Phi(1) = 0.841344739.



Answer: approximately 0.8351

1. z_lower = (-2.5 - 0) / 1 = -2.5; z_upper = (1 - 0) / 1 = 1.
2. P(-2.5 < X < 1) = Phi(1) - Phi(-2.5) = 0.8351.