

Math Sheet

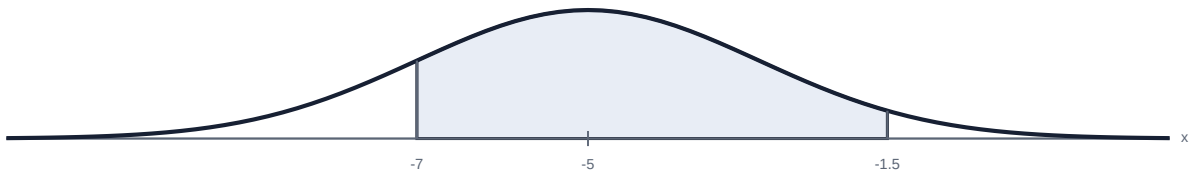
Name _____ Score _____ Teacher _____ Date _____

Normal Distribution

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

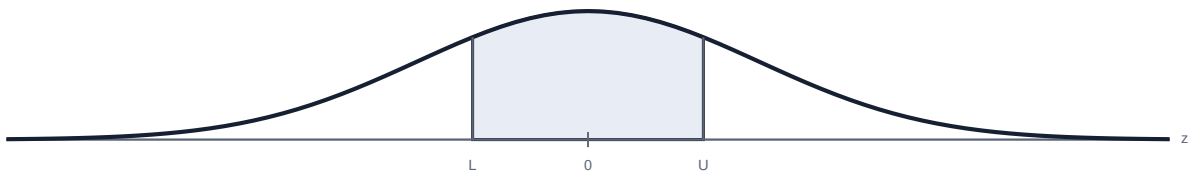
1. X is normal with mean -5 and standard deviation 2. Find $P(-7 < X < -1.5)$.

Provided normal-CDF values: $\Phi(-1) \approx 0.158655261$; $\Phi(1.75) \approx 0.959940845$.



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.



Math Sheet

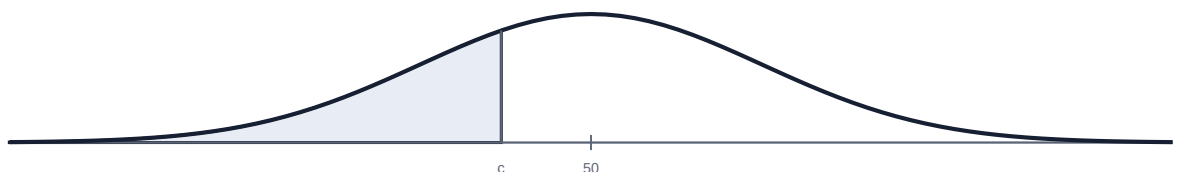
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Normal Distribution

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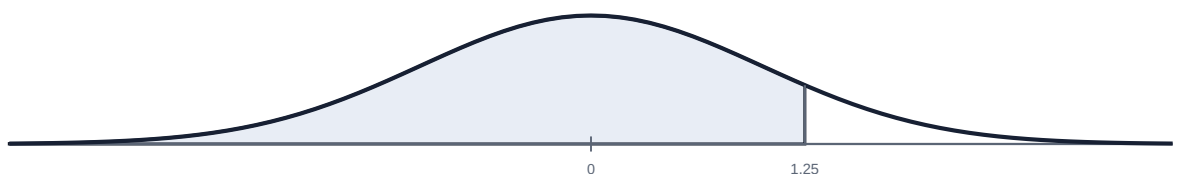
3. X is normal with mean 50 and standard deviation 4. Find cutoff c such that $P(X \leq c) = 0.3$. Round c to two decimal places.

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: $\Phi(1.25) = 0.894350220$.



Math Sheet

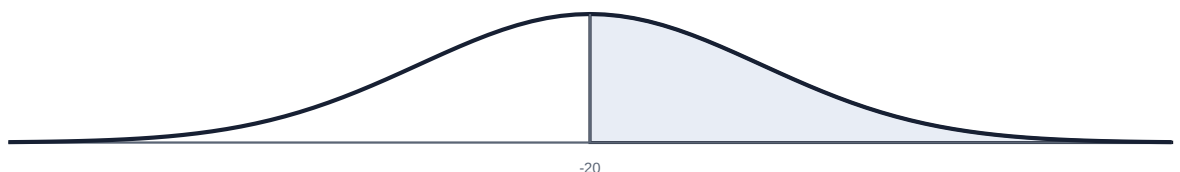
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Normal Distribution

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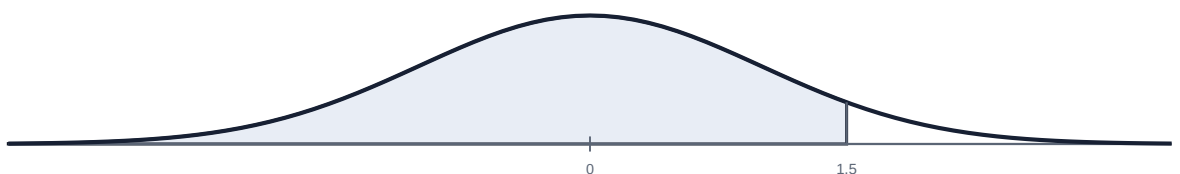
5. X is normal with mean -20 and standard deviation 4 . Find $P(X > -20)$.

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: $\Phi(1.5) = 0.933192798$.



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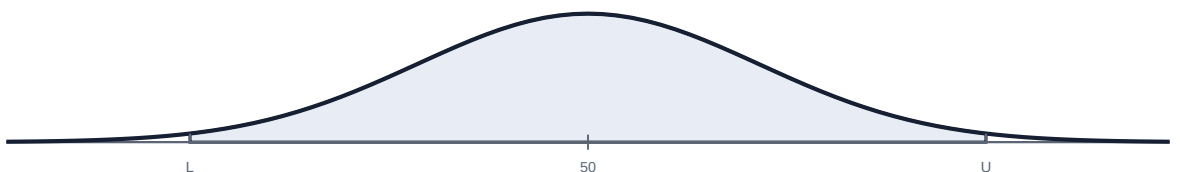
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Normal Distribution

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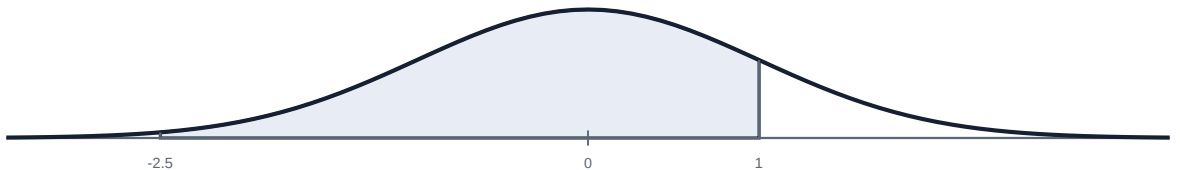
7. X is normal with mean 50 and standard deviation 2. Find the symmetric central interval $[L, U]$ containing probability 0.98. Round endpoints to two decimal places.

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: $\Phi(-2.5) = 0.006209665$; $\Phi(1) = 0.841344739$.



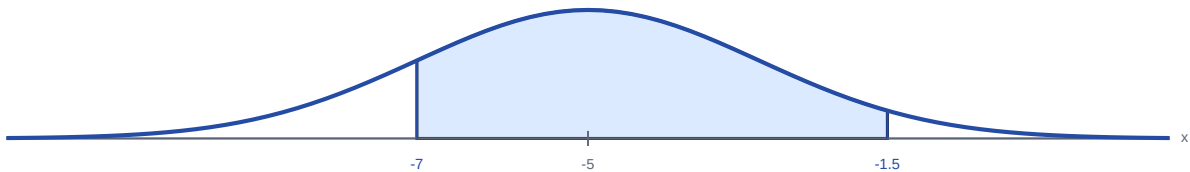
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with $z = (x - \text{mean}) / \text{standard deviation}$. 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: $\Phi(-1) = 0.158655261$; $\Phi(1.75) = 0.959940845$.

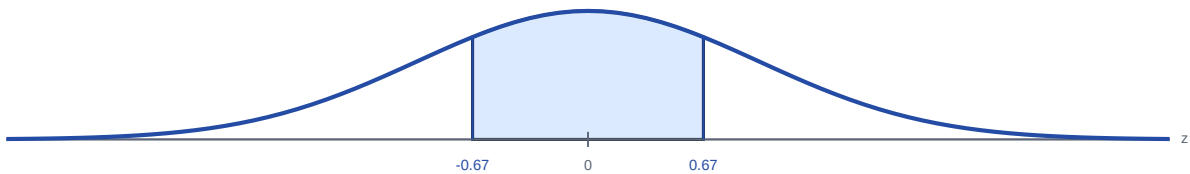


Answer: approximately 0.8013

1. $z_{\text{lower}} = (-7 - -5) / 2 = -1$; $z_{\text{upper}} = (-1.5 - -5) / 2 = 1.75$.
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. $z_{\text{upper}} = \Phi^{-1}(0.75) = 0.674490$ and $z_{\text{lower}} = -0.674490$.
3. $L = 0 - (0.674490)(1) = -0.67$; $U = 0 + (0.674490)(1) = 0.67$.

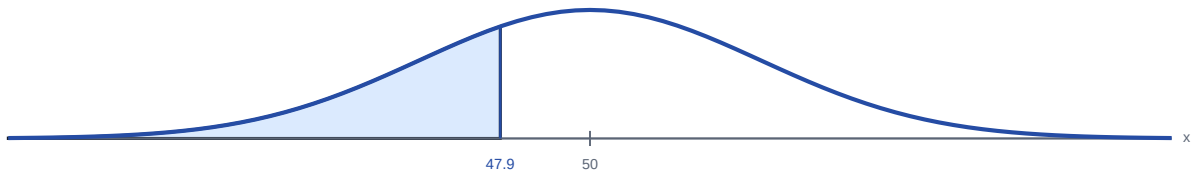
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with $z = (x - \text{mean}) / \text{standard deviation}$. 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 $P(X \leq c) = 0.3$. Round c to two decimal places.

Provided inverse-normal value: $\Phi^{-1}(0.3) = -0.524400$.



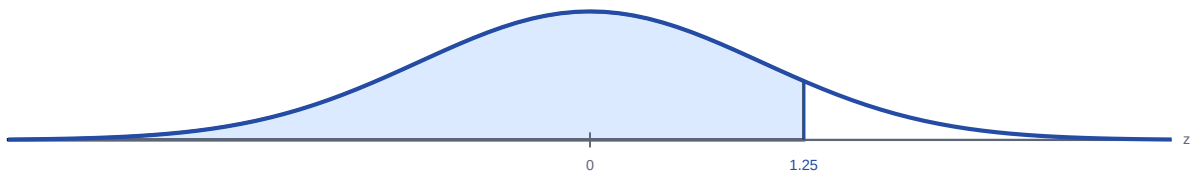
Answer: c approximately 47.90

1. $z = \Phi^{-1}(0.3) = -0.524400$.

2. $c = \text{mean} + z(\text{standard deviation}) = 50 + (-0.524400)(4) = 47.90$.

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. $P(X < 1.25) = \Phi(1.25) = 0.8944$.

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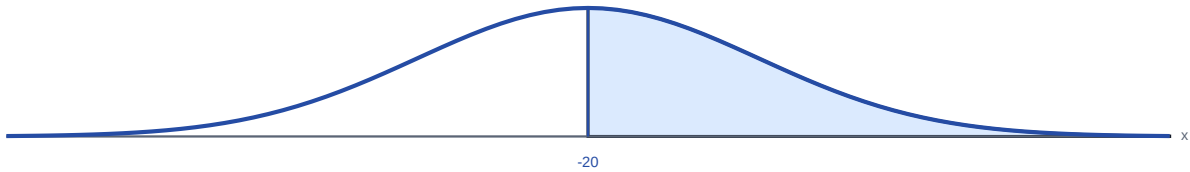
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with $z = (x - \text{mean}) / \text{standard deviation}$. 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: $\Phi(0) = 0.499999985$.

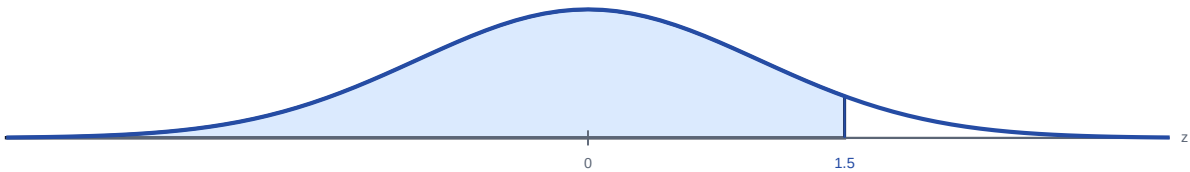


Answer: approximately 0.5000

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. $P(X < 1.5) = \Phi(1.5) = 0.9332$.

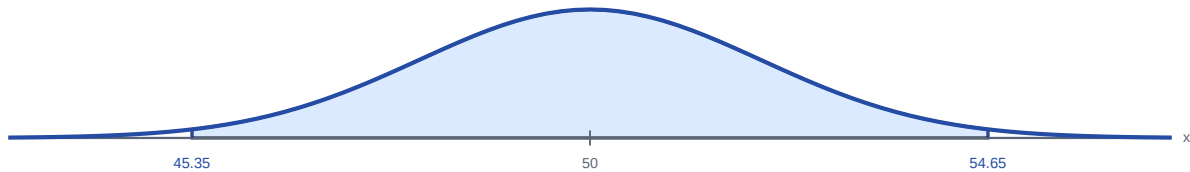
Normal Distribution

Worked Answer Key

For X normally distributed with the stated mean and positive standard deviation, standardize with $z = (x - \text{mean}) / \text{standard deviation}$. 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.

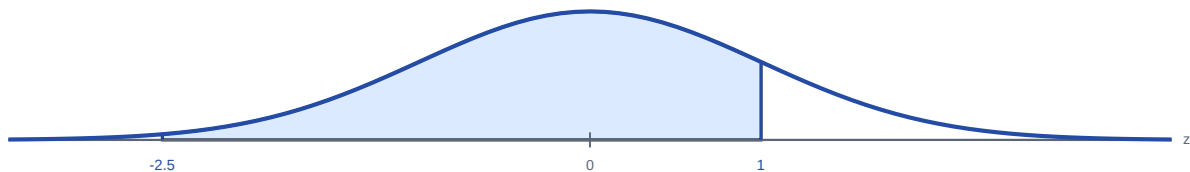


Answer: [45.35, 54.65]

- Each tail has probability $(1 - 0.98) / 2 = 0.01$; the upper cumulative probability is 0.99.
- $z_{\text{upper}} = \Phi^{-1}(0.99) = 2.326348$ and $z_{\text{lower}} = -2.326348$.
- $L = 50 - (2.326348)(2) = 45.35$; $U = 50 + (2.326348)(2) = 54.65$.

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

- $z_{\text{lower}} = (-2.5 - 0) / 1 = -2.5$; $z_{\text{upper}} = (1 - 0) / 1 = 1$.
- $P(-2.5 < X < 1) = \Phi(1) - \Phi(-2.5) = 0.8351$.