Working Backwards with the Normal Distribution

Average IQ Scores by Country 2021 Average IQ by State 2021 IQ Classifications

IQ Scores are Normally Distributed with a mean of 100 and a standard deviation of 15.

What IQ Score is needed to be considered a Genius?



What IQ Score is needed to be eligible for MENSA membership?





A term that is no longer in use!

The key to answering all these questions is to work backwards!

We will use the TI Calculator and the InvNorm



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter



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InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.04,100,15,Right)



 $x \approx 126$

Top 4%



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InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.02,100,15,Right)



Bottom 2%



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- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.02,100,15,Left)



Common Questions Over the Bell-Shaped Curve Working Backwards

Top 10% or 90th Percentile or 9th Decile



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InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.10,100,15,Right)



Top 5% or 95th Percentile



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- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.05,100,15,Right)



Top 1% or 99th Percentile



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- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.01,100,15,Right)



Bottom 10% or 10th Percentile or 1st Decile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.10,100,15,Left)



Bottom 5% or 5th Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.05,100,15,Left)



Bottom 1% or 1st Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.01,100,15,Left)



1st Quartile or 25th Percentile



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- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.25,100,15,Left)



3rd Quartile or 75th Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.25,100,15,Right)



85th Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.85,100,15,Left)



6th Decile or 60th Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

- 1. Press **2**nd then **vars** to access DISTR (distributions) menu.
- 2. Select InvNorm and click enter.
- 3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (<mark>0.60</mark>,100,15,Left)



4th Decile or 40th Percentile



TI-83 or TI-84 Plus Finding the z vaue corresponding to a known area.

1. Press **2nd** then **vars** to access DISTR (distributions) menu.

2. Select InvNorm and click enter.

3. Enter the shaded area assocaited with the x value, enter the mean μ , enter the standard deviation σ

InvNorm(shaded area, μ , σ , left or right) and press enter

InvNorm (0.40,100,15,Left)

