Question 1

What proportion of a population having a normal (bell curve) distribution with a mean of 50 and a standard deviation of 10 lies below 57?

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What proportion of a population having a normal (bell curve) distribution with a mean of 50 and a standard deviation of 10 lies below 57?

The proportion is 0.758

$= NORMDIST(57, 50, 10, TRUE)$

Question 2

What proportion of a population having a normal (bell curve) distribution with a mean of 100 and a standard deviation of 15 lies below 125?

Question 2

What proportion of a population having a normal (bell curve) distribution with a mean of 100 and a standard deviation of 15 lies below 125?

The proportion is 0.952

$= NORMDIST(125, 100, 15, TRUE)$

Question 3

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that a randomly selected individual scores below 450 on the SAT.

Question 3

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that a randomly selected individual scores below 450 on the SAT.

The probability is 0.309. This is the same as the proportion of the population that scores below 450.

$= NORMDIST(450, 500, 100, TRUE)$

Question 4

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that a randomly selected individual scores above 650 on the SAT.

Question 4

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that a randomly selected individual scores above 650 on the SAT.

The probability is 0.067. This is the same as the proportion of the population that scores above 650.

$= 1 - NORMDIST(650, 500, 100, TRUE)$

Question 5

What proportion of a population having a normal (bell curve) distribution with a mean of 100 and a standard deviation of 15 lies above 105?

Question 5

What proportion of a population having a normal (bell curve) distribution with a mean of 100 and a standard deviation of 15 lies above 105?

The proportion is 0.369

$= 1 - NORMDIST(105, 100, 15, TRUE)$

Question 6

What proportion of a population having a normal (bell curve) distribution with a mean of 50 and a standard deviation of 10 lies above 47?

Question 6

What proportion of a population having a normal (bell curve) distribution with a mean of 50 and a standard deviation of 10 lies above 47?

The proportion is 0.618

$= 1 - NORMDIST(47, 50, 10, TRUE)$

Question 7

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. What proportion of the population scores between 400 and 600 on the SAT?

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SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. What proportion of the population scores between 400 and 600 on the SAT?

The proportion is 0.683. 68.3% of people who take the SAT score between 400 and 600.

$= NORMDIST(600, 500, 100, TRUE) - NORMDIST(400, 500, 100, TRUE)$

Question 8

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What proportion of the population scores between 95 and 105 on an IQ test?

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IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What proportion of the population scores between 95 and 105 on an IQ test?

The proportion is 0.261. 26.1% of people who take an IQ test score between 95 and 105.

$= NORMDIST(105, 100, 15, TRUE) -$
$NORMDIST(95, 100, 15, TRUE)$

Question 9

What proportion of a population having a normal (bell curve) distribution with a mean of 50 and a standard deviation of 10 lies between 42 and 58?

Question 9

What proportion of a population having a normal (bell curve) distribution with a mean of 50 and a standard deviation of 10 lies between 42 and 58?

The proportion is 0.576

$= NORMDIST(58, 50, 10, TRUE) - NORMDIST(42, 50, 10, TRUE)$

Question 10

What proportion of a population having a normal (bell curve) distribution with a mean of 150 and a standard deviation of 10 lies below 135 or above 165?

Question 10

What proportion of a population having a normal (bell curve) distribution with a mean of 150 and a standard deviation of 10 lies below 135 or above 165?

The proportion is 0.134

$= 1 - NORMDIST(165, 150, 10, TRUE) + NORMDIST(135, 150, 10, TRUE)$

Question 11

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What proportion of the population scores below 92 or above 108 on an IQ test?

Question 11

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What proportion of the population scores below 92 or above 108 on an IQ test?

The proportion is 0.594. 59.4% of people who take an IQ test score below 92 or above 108.

$= 1 - NORMDIST(108, 100, 15, TRUE) +$
$NORMDIST(92, 100, 15, TRUE)$

Question 12

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. What proportion of the population scores below 450 or above 550 on the SAT?

Question 12

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. What proportion of the population scores below 450 or above 550 on the SAT?

The proportion is 0.617. 61.7% of people who take the SAT score below 450 or above 550.

$= 1 - NORMDIST(550, 500, 100, TRUE) + NORMDIST(450, 500, 100, TRUE)$

Question 13

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that the mean of a sample of 50 is below 510.

Question 13

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that the mean of a sample of 50 is below 510.

The probability is 0.760.

$= NORMDIST(510, 500, 100/SQRT(50), TRUE)$

Question 14

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that the mean of a sample of 200 is below 498.

Question 14

SAT scores have a normal (bell curve) distribution with mean of 500 and standard deviation of 100. Find the probability that the mean of a sample of 200 is below 498.

The probability is 0.389.

$= NORMDIST(498, 500, 100/SQRT(200), TRUE)$

Question 15

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What is the probability that a sample of 100 has a mean greater than 101?

Question 15

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What is the probability that a sample of 100 has a mean greater than 101?

The proportion is 0.252.

$= 1 - NORMDIST(101, 100, 15/SQRT(100), TRUE)$

Question 16

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What is the probability that a sample of 100 has a mean between 98 and 102?

Question 16

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What is the probability that a sample of 100 has a mean between 98 and 102?

The proportion is 0.818

$= NORMDIST(102, 100, 15/SQRT(100), TRUE) - NORMDIST(98, 100, 15/SQRT(100), TRUE)$

Question 17

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What is the 75^{th} percentile of the distribution of means of samples of size 80?

Question 17

IQ scores have a normal (bell curve) distribution with mean of 100 and standard deviation of 15. What is the 75^{th} percentile of the distribution of means of samples of size 80?

The 75^{th} percentile is 101.13.

$= NORMINV(.75, 100, 15/SQRT(80), TRUE)$

Question 18

45% of people support a proposed law. Find the probability that fewer than 85 in a sample of 200 support the law.

Question 18

45% of people support a proposed law. Find the probability that fewer than 85 in a sample of 200 support the law.

The probability is 0.239. The normal approximation is valid.

$= NORMDIST(85, .45 * 200, SQRT(.45 * (1 - .45)/SQRT(200)), TRUE)$

Question 19

55% of people support a proposed law. Find the probability that between 110 and 120 in a sample of 200 support the law.

Question 19

55% of people support a proposed law. Find the probability that between 110 and 120 in a sample of 200 support the law.

The probability is 0.422. The normal approximation is valid.

$= NORMDIST(120, .55 * 200, SQRT(.55 * (1 - .55)/SQRT(200)), TRUE) - NORMDIST(110, .55 * 200, SQRT(.55 * (1 - .55)/SQRT(200)), TRUE)$

Question 20

85% of people wear seatbelts while driving. A remote camera photographs 500 cars as they pass beneath it, allowing determiniation of whether the driver is wearing a seat belt or not. Find the probability that between 410 and 420 of the drivers photographed are wearing seatbelts.

Question 20

85% of people wear seatbelts while driving. A remote camera photographs 500 cars as they pass beneath it, allowing determiniation of whether the driver is wearing a seat belt or not. Find the probability that between 410 and 420 of the drivers photographed are wearing seatbelts.

The probability is 0.235. The normal approximation is valid.

$= NORMDIST(410, .85 * 500, SQRT(.85 * (1 - .85)/SQRT(500)), TRUE) - NORMDIST(420, .85 * 500, SQRT(.85 * (1 - .85)/SQRT(500)), TRUE)$

Question 21

SAT scores have a normal (bell curve) distribution standard deviation of 100. A sample of 150 has a mean of 497.5. Find a 95% confidence interval for the mean of this population.

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SAT scores have a normal (bell curve) distribution standard deviation of 100. A sample of 150 has a mean of 497.5. Find a 95% confidence interval for the mean of this population.

type: sigma known
The interval is $(481.5, 513.5)$

Question 22

28% of mosquitoes in a certain county are believed to carry the HGE pathogen. Find the probability that between 50 and 60 of 235 mosquitoes removed from a trap test positive for HGE.

Question 22

28% of mosquitoes in a certain county are believed to carry the HGE pathogen. Find the probability that between 50 and 60 of 235 mosquitoes removed from a trap test positive for HGE.

The probability is 0.189. The normal approximation is valid.

$= NORMDIST(60, .28 * 235, SQRT(.28 * (1 - .28)/SQRT(235)), TRUE) - NORMDIST(50, .28 * 235, SQRT(.28 * (1 - .28)/SQRT(235)), TRUE)$

Question 23

A sample of 22 gears from a large production run has has a mean diameter of $76.1mm$ with a standard deviation of $0.2mm$. Find a 95% confidence interval for the mean gear diameter of the production run assuming the gear diameter has a normal distribution.

Question 23

A sample of 22 gears from a large production run has has a mean diameter of $76.1mm$ with a standard deviation of $0.2mm$. Find a 95% confidence interval for the mean gear diameter of the production run assuming the gear diameter has a normal distribution.

type: sigma unknown
The interval is $(76.01, 76.19)$

Question 24

SAT scores have a normal (bell curve) distribution with a standard deviation of 100. A sample of 50 has a mean of 502.5. Find a 99% confidence interval for the mean of this population.

Question 24

SAT scores have a normal (bell curve) distribution with a standard deviation of 100. A sample of 50 has a mean of 502.5. Find a 99% confidence interval for the mean of this population.

type: sigma known
The interval is $(466.1, 538.9)$

Question 25

IQ scores have a normal (bell curve) distribution with a standard deviation of 15. A sample of 125 has a mean of 103.4. Find a 95% confidence interval for the mean of this population.

Question 25

IQ scores have a normal (bell curve) distribution with a standard deviation of 15. A sample of 125 has a mean of 103.4. Find a 95% confidence interval for the mean of this population.

type: sigma known
The interval is $(100.8, 106.0)$

Question 26

A sample of 44 walleye pike from a lake run has has a mean weight of $7.2kg$ with a sample standard deviation of $1.3kg$. Find a 95% confidence interval for the mean weight of the population.

Question 26

A sample of 44 walleye pike from a lake run has has a mean weight of $7.2kg$ with a sample standard deviation of $1.3kg$. Find a 95% confidence interval for the mean weight of the population.

type: sigma unknown
The interval is $(6.8, 7.6)$

Question 27

A sample of 47 times for emergency medical response had a mean time of 4.2 minutes with a sample standard deviation of 1.3 minutes. Find a 99% confidence interval for the population mean response time.

Question 27

A sample of 47 times for emergency medical response had a mean time of 4.2 minutes with a sample standard deviation of 1.3 minutes. Find a 99% confidence interval for the population mean response time.

type: sigma unknown
The interval is $(3.69, 4.71)$

Question 28

A sample of 35 melting temperatures for pyrometric cones has a mean of 897.3 degrees with a standard deviation of 2.1 degrees. Find a 95% confidence interval for the population mean response time.

Question 28

A sample of 35 melting temperatures for pyrometric cones has a mean of 897.3 degrees with a standard deviation of 2.1 degrees. Find a 95% confidence interval for the population mean response time.

type: sigma unknown
The interval is $(896.58, 898.02)$

Question 29

Animal shelter records indicate that in 27 of 85 feline deaths the cause was leukemia. Find a 95% confidence interval for the proportion of feline deaths due to leukemia.

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Animal shelter records indicate that in 27 of 85 feline deaths the cause was leukemia. Find a 95% confidence interval for the proportion of feline deaths due to leukemia.

type: proportion
$(0.22, 0.42)$

Question 30

A sample of 75 automobiles made by a certain manufacture that were sold 15 years ago reveals that 62 are still in use. Find a 95% confidence interval for the proportion of 15 year old cars of this make that are still in use.

Question 30

A sample of 75 automobiles made by a certain manufacture that were sold 15 years ago reveals that 62 are still in use. Find a 95% confidence interval for the proportion of 15 year old cars of this make that are still in use.

type: proportion

$(0.74, 0.91)$