

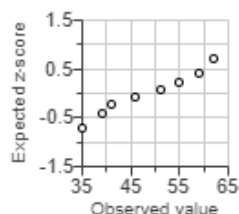
- 1) Use the accompanying data table to (a) draw a normal probability plot, (b) determine the linear correlation between the observed values and expected z-scores, (c) determine the critical value in the table of critical values of the correlation coefficient to assess the normality of the data.

[Click here to view the data table.](#)

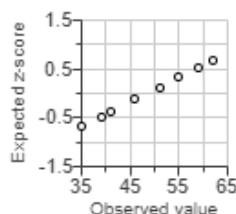
[Click here to view the table of critical values of the correlation coefficient.](#)

(a) Choose the correct plot below.

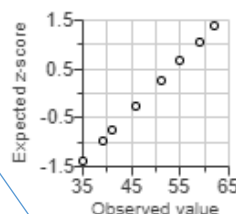
☐ A.



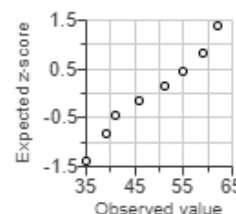
☐ B.



☐ C.



☒ D.



STATCRUNCH – GRAPH – QQ PLOT

Select column(s):

Index, i
Observed Value
f_i
Expected z-score

Where:

--optional--

Group by:

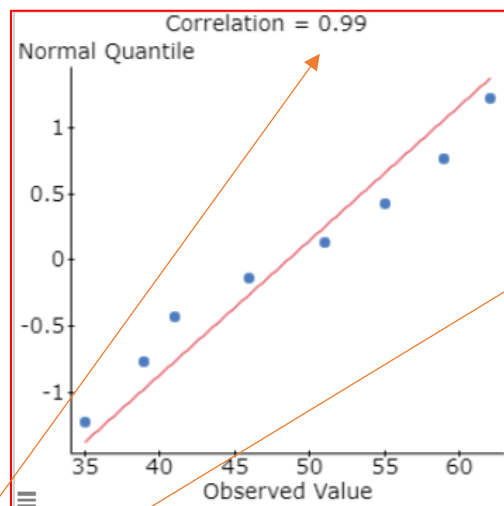
--optional--

Add:

☒ Correlation statistic

Other options:

☒ Normal quantiles on y-axis



Critical value for $n=8$ is .906

n is # of values in the set

Sample Size, n	Critical Value
5	0.880
6	0.888
7	0.898
8	0.906
9	0.912
10	0.918

(b) The correlation is 0.99

(c) The critical value 0.906

*click on the critical value table and use sample size number

- 2) Suppose a sample of O-rings was obtained and the wall thickness (in inches) of each was recorded. Use a normal probability plot to assess whether the sample data could have come from a population that is normally distributed.

0.164	0.179	0.197	0.207
0.225	0.232	0.240	0.245
0.255	0.255	0.276	0.276
0.286	0.296	0.312	0.346

[Click here to view the table of critical values.](#)

[Click here to view page 1 of the standard normal distribution table.](#)

[Click here to view page 2 of the standard normal distribution table.](#)

QQ PLOT to find correlation

- D. Yes. The correlation between the expected z-scores and the observed data, .996, exceeds the critical value, .941. Therefore, it is reasonable to conclude that the data come from a normal population.

Critical value for $n=16$ is .941

n is # of values in the set

Sample Size, n	Critical Value
16	0.941
17	0.944
18	0.946

Select column(s):

var1

Where:

--optional--

Group by:

--optional--

Add:

☒ Correlation statistic

Other options:

☒ Normal quantiles on y-axis

- 3) A random sample of 16 undergraduate students receiving student loans was obtained, and the amounts of their loans for the school year were recorded. Use a normal probability plot to assess whether the sample data could have come from a population that is normally distributed.

6,200	2,300	6,300	1,200
6,700	8,400	4,700	2,800
1,200	7,700	3,000	2,700
2,000	5,500	3,900	7,300

[Click here to view the table of critical values.](#)

[Click here to view page 1 of the standard normal distribution table.](#)

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QQ PLOT to find correlation

Critical value for $n=16$ is .941

Using the correlation coefficient of the normal probability plot, is it reasonable to conclude that the population is normally distributed? Select the correct choice below and fill in the answer boxes within your choice.

(Round to three decimal places as needed.)

- A. Yes. The correlation between the expected z-scores and the observed data, .98, exceeds the critical value, .941. Therefore, it is reasonable to conclude that the data come from a normal population.

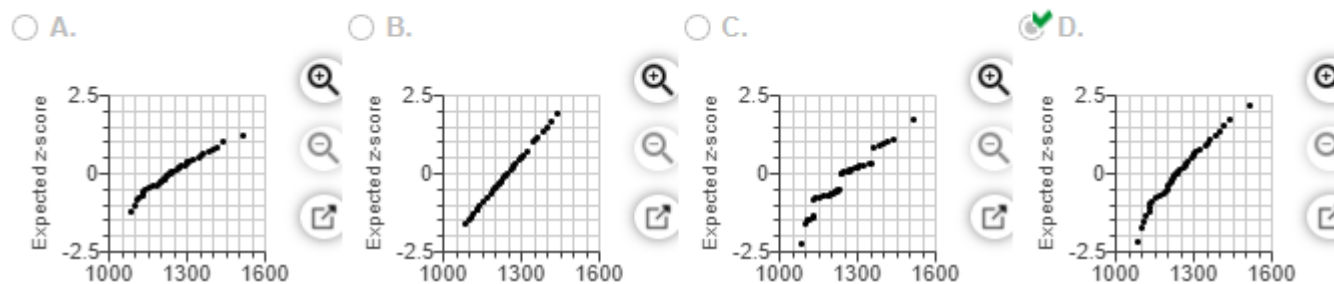
- 4) In an advertising campaign, a snack company claimed that every 18-ounce bag of its cookies contained at least 1000 chocolate chips. Two statisticians attempted to verify the claim. The accompanying data represent the number of chips in an 18-ounce bag of the company's cookies based on their study. Complete parts (a) through (e).

[Click here to view the chocolate chip data table.](#)

[Click here to view the standard normal distribution table \(page 1\).](#)

[Click here to view the standard normal distribution table \(page 2\).](#)

QQ PLOT to find graph



STAT – SUMMARY STATS - COLUMNS

Summary Stats

var1

Where:
--optional--

Group by:
--optional--

Statistics:

Mean
Variance
Std. dev.
Std. err.
Median

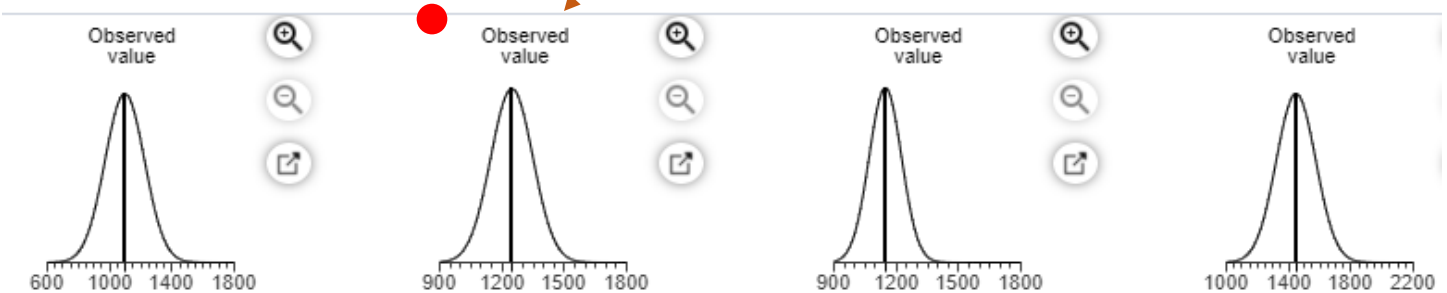
The mean of the sample data is 1247.3.
(Round to one decimal place as needed.)

The standard deviation of the sample data is 101.2.
(Round to one decimal place as needed.)

Summary statistics:

Column	Mean	Median	Std. dev.
var1	1247.275	1235.5	101.24456

Use median to find where middle line is on graph



STATS – CALCULATORS – NORMAL

Use mean and St dev from previous step

(d) Using the normal model from part (c), find the probability that an 18-ounce bag of chips selected at random contains at least 1000 chips.

The probability is .993.

$$\text{Mean: } 1247.3 \quad \text{Std. Dev.: } 101.2$$

$$P(X \geq 1000) = 0.99273076$$

(e) Using the normal model from part (c), find the probability that an 18-ounce bag of chips selected at random contains between 1100 and 1300 chips.

The probability is .626.
(Round to three decimal places as needed.)

$$\text{Mean: } 1247.3 \quad \text{Std. Dev.: } 101.2$$

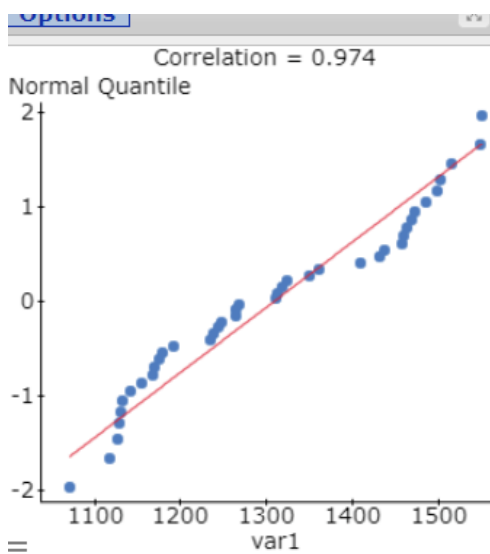
$$P(1100 \leq X \leq 1300) = 0.62596908$$

5) A normal probability plot is a graph that plots observed data versus normal scores.

- 6) A normal score is the expected z-score of a data value, assuming the distribution of the random variable is normal. Is this statement true or false?

Choose the correct answer below.

☒ A. The statement is true.



A study found that the mean amount of time cars spent in drive-throughs of a certain fast-food restaurant was 137.9 seconds. Assuming drive-through times are normally distributed with a standard deviation of 30 seconds, complete parts (a) through (d) below.

[Click here to view the standard normal distribution table \(page 1\).](#)

[Click here to view the standard normal distribution table \(page 2\).](#)

STATS – CALCULATORS - NORMAL

- (a) What is the probability that a randomly selected car will get through the restaurant's drive-through in less than 85 seconds?

The probability that a randomly selected car will get through the restaurant's drive-through in less than 85 seconds is **0.0389**.
(Round to four decimal places as needed.)

- (b) What is the probability that a randomly selected car will spend more than 187 seconds in the restaurant's drive-through?

The probability that a randomly selected car will spend more than 187 seconds in the restaurant's drive-through is **0.0509**.
(Round to four decimal places as needed.)

- (c) What proportion of cars spend between 2 and 3 minutes in the restaurant's drive-through?

The proportion of cars that spend between 2 and 3 minutes in the restaurant's drive-through is **0.6444**.
(Round to four decimal places as needed.)

use 120 and 180
for seconds

- (d) Would it be unusual for a car to spend more than 3 minutes in the restaurant's drive-through? Why?

The probability that a car spends more than 3 minutes in the restaurant's drive-through is **0.0803**, so it **would not** be unusual, since the probability is **greater** than 0.05.
(Round to four decimal places as needed.)