

6.1E: The Standard Normal Distribution (Exercises)

Exercise 6.2.7

A bottle of water contains 12.05 fluid ounces with a standard deviation of 0.01 ounces. Define the random variable X in words.
 $X =$ _____.

Answer

ounces of water in a bottle

Exercise 6.2.8

A normal distribution has a mean of 61 and a standard deviation of 15. What is the median?

Exercise 6.2.9

$X \sim N(1, 2)$

$\sigma =$ _____

Answer

2

Exercise 6.2.10

A company manufactures rubber balls. The mean diameter of a ball is 12 cm with a standard deviation of 0.2 cm. Define the random variable X in words. $X =$ _____.

Exercise 6.2.11

$X \sim N(-4, 1)$

What is the median?

Answer

-4

Exercise 6.2.12

$X \sim N(3, 5)$

$\sigma =$ _____

Exercise 6.2.13

$X \sim N(-2, 1)$

$\mu =$ _____

Answer

-2

Exercise 6.2.14

What does a z -score measure?

Exercise 6.2.15

What does standardizing a normal distribution do to the mean?

Answer

The mean becomes zero.

Exercise 6.2.16

Is $X \sim N(0, 1)$ a standardized normal distribution? Why or why not?

Exercise 6.2.17

What is the z -score of $x = 12$, if it is two standard deviations to the right of the mean?

Answer

$$z = 2$$

Exercise 6.2.18

What is the z -score of $x = 9$, if it is 1.5 standard deviations to the left of the mean?

Exercise 6.2.19

What is the z -score of $x = -2$, if it is 2.78 standard deviations to the right of the mean?

Answer

$$z = 2.78$$

Exercise 6.2.20

What is the z -score of $x = 7$, if it is 0.133 standard deviations to the left of the mean?

Exercise 6.2.21

Suppose $X \sim N(2, 6)$. What value of x has a z -score of three?

Answer

$$x = 20$$

Exercise 6.2.22

Suppose $X \sim N(8, 1)$. What value of x has a z -score of -2.25 ?

Exercise 6.2.23

Suppose $X \sim N(9, 5)$. What value of x has a z -score of -0.5 ?

Answer

$$x = 6.5$$

Exercise 6.2.24

Suppose $X \sim N(2, 3)$. What value of x has a z -score of -0.67 ?

Exercise 6.2.25

Suppose $X \sim N(4, 2)$. What value of x is 1.5 standard deviations to the left of the mean?

Answer

$$x = 1$$

Exercise 6.2.26

Suppose $X \sim N(4, 2)$. What value of x is two standard deviations to the right of the mean?

Exercise 6.2.27

Suppose $X \sim N(8, 9)$. What value of x is 0.67 standard deviations to the left of the mean?

Answer

$$x = 1.97$$

Exercise 6.2.28

Suppose $X \sim N(-1, 12)$. What is the z -score of $x = 2$?

Exercise 6.2.29

Suppose $X \sim N(12, 6)$. What is the z -score of $x = 2$?

Answer

$z = -1.67$

Exercise 6.2.30

Suppose $X \sim N(9, 3)$. What is the z -score of $x = 9$?

Exercise 6.2.31

Suppose a normal distribution has a mean of six and a standard deviation of 1.5. What is the z -score of $x = 5.5$?

Answer

$z \approx -0.33$

Exercise 6.2.32

In a normal distribution, $x = 5$ and $z = -1.25$. This tells you that $x = 5$ is ____ standard deviations to the ____ (right or left) of the mean.

Exercise 6.2.33

In a normal distribution, $x = 3$ and $z = 0.67$. This tells you that $x = 3$ is ____ standard deviations to the ____ (right or left) of the mean.

Answer

0.67, right

Exercise 6.2.34

In a normal distribution, $x = -2$ and $z = 6$. This tells you that $x = -2$ is ____ standard deviations to the ____ (right or left) of the mean.

Exercise 6.2.35

In a normal distribution, $x = -5$ and $z = -3.14$. This tells you that $x = -5$ is ____ standard deviations to the ____ (right or left) of the mean.

Answer

3.14, left

Exercise 6.2.36

In a normal distribution, $x = 6$ and $z = -1.7$. This tells you that $x = 6$ is ____ standard deviations to the ____ (right or left) of the mean.

Exercise 6.2.37

About what percent of x values from a normal distribution lie within one standard deviation (left and right) of the mean of that distribution?

Answer

about 68%

Exercise 6.2.38

About what percent of the x values from a normal distribution lie within two standard deviations (left and right) of the mean of that distribution?

Exercise 6.2.39

About what percent of x values lie between the second and third standard deviations (both sides)?

Answer

about 4%

Exercise 6.2.40

Suppose $X \sim N(15, 3)$. Between what x values does 68.27% of the data lie? The range of x values is centered at the mean of the distribution (i.e., 15).

Exercise 6.2.41

Suppose $X \sim N(-3, 1)$. Between what x values does 95.45% of the data lie? The range of x values is centered at the mean of the distribution (i.e., -3).

Answer

between -5 and -1

Exercise 6.2.42

Suppose $X \sim N(-3, 1)$. Between what x values does 34.14% of the data lie?

Exercise 6.2.43

About what percent of x values lie between the mean and three standard deviations?

Answer

about 50%

Exercise 6.2.44

About what percent of x values lie between the mean and one standard deviation?

Exercise 6.2.45

About what percent of x values lie between the first and second standard deviations from the mean (both sides)?

Answer

about 27%

Exercise 6.2.46

About what percent of x values lie between the first and third standard deviations(both sides)?

Use the following information to answer the next two exercises: The life of Sunshine CD players is normally distributed with mean of 4.1 years and a standard deviation of 1.3 years. A CD player is guaranteed for three years. We are interested in the length of time a CD player lasts.

Exercise 6.2.47

Define the random variable X in words. $X =$ _____.

Answer

The lifetime of a Sunshine CD player measured in years.

Exercise 6.2.48

$X \sim$ ____ (____, ____)

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