

4.2E: The Standard Normal Distribution (Exercises)

? Exercise 4.2E. 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 4.2E. 8

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

? Exercise 4.2E. 9

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

$$\sigma = \underline{\hspace{1cm}}$$

Answer

2

? Exercise 4.2E. 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 4.2E. 11

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

What is the median?

Answer

-4

? Exercise 4.2E. 12

$$X \sim N(3, 5)$$

$$\sigma = \underline{\hspace{1cm}}$$

? Exercise 4.2E. 13

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

$$\mu = \underline{\hspace{1cm}}$$

Answer

-2

? Exercise 4.2E. 14

What does a z -score measure?

? Exercise 4.2E. 15

What does standardizing a normal distribution do to the mean?

Answer

The mean becomes zero.

? Exercise 4.2E. 16

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

? Exercise 4.2E. 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 4.2E. 18

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

? Exercise 4.2E. 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 4.2E. 20

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

? Exercise 4.2E. 21

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

Answer

$x = 20$

? Exercise 4.2E. 22

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

? Exercise 4.2E. 23

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

Answer

$x = 6.5$

? Exercise 4.2E. 24

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

? Exercise 4.2E. 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 4.2E. 26

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

? Exercise 4.2E. 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 4.2E. 28

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

? Exercise 4.2E. 29

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

Answer

$$z = -1.67$$

? Exercise 4.2E. 30

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

? Exercise 4.2E. 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 4.2E. 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 4.2E. 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 4.2E. 34

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

? Exercise 4.2E. 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 4.2E. 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 4.2E. 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 4.2E. 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 4.2E. 39

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

Answer

about 4%

? Exercise 4.2E. 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 4.2E. 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 4.2E. 42

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

? Exercise 4.2E. 43

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

Answer

about 50%

? Exercise 4.2E. 44

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

? Exercise 4.2E. 45

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

Answer

about 27%

? Exercise 4.2E. 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 4.2E. 47

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

Answer

The lifetime of a Sunshine CD player measured in years.

? Exercise 4.2E. 48

$X \sim$ ____ (____, ____)

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