Example 1:

Find the area under a normal distribution from $z = 0$ to $z = 2.5$. (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation $P(a < z < b) = Area$.

Example 2:

Find the area under a normal distribution from $z = 0$ to $z = -1.64$. (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation $P(a < z < b) = Area$.

Example 3:

Find the area under a normal distribution to the right of $z = 1.72$. (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation $P(z > b) = Area$. 

Example 4:

Find the area under a normal distribution to the left of \( z = -1.33 \). (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation \( P(z < b) = \text{Area} \).

Example 5:

Find the area under a normal distribution from \( z = -1.5 \) to \( z = 2.25 \). (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation \( P(a < z < b) = \text{Area} \).
Answers

1. Find the area under a normal distribution from $z = 0$ to $z = 2.5$. (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation $P(a < z < b) = \text{Area}$

If we look up the area for $z = 2.5$, we find 0.4938

This is the area that is shaded above.

In probability notation we write $P(0 < z < 2.5) = 0.4938$

2. Find the area under a normal distribution from $z = 0$ to $z = -1.64$. (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation $P(a < z < b) = \text{Area}$.

The area from 0 to 1.64 will be the same as the area from 0 to -1.64

If we look up the area for $z = 1.64$, we find 0.4495. This is the area shaded above.

In probability notation we write $P(-1.64 < z < 0) = 0.4495$
3. Find the area under a normal distribution to the right of \( z = 1.72 \). (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation \( P(z > b) = \text{Area} \).

If we look up the area for \( z = 1.72 \), we find 0.4573. This is the area starting at \( z = 0 \) and going out to \( z = 1.72 \).

So, observe that 0.4573 + shaded area that we want to find = 0.5000 (half of the distribution). The shaded area = 0.5000 – 0.4573 = 0.0427.
In summary, \( P(z > 1.72) = 0.0427 \).

4. Find the area under a normal distribution to the left of \( z = -1.33 \). (Show brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation \( P(z < b) = \text{Area} \).

If we look up the area for \( z = 1.33 \), we find 0.4082. This is the area starting at \( z = 0 \) and going out to \( z = +1.33 \). By symmetry, the area from 0 to \(-1.33 \) is also 0.4082.

So, observe that 0.4082 + shaded area that we want to find = 0.5000 (half of the distribution). The shaded area = 0.5000 – 0.4082 = 0.0918.
In summary, \( P(z < -1.33) = 0.0918 \).
Example 5:

Find the area under a normal distribution from $z = -1.5$ to $z = 2.25$. (Show a brief picture with the appropriate area shaded and show how you got your answer.) Also, write your final answer using probability notation $P(a < z < b) = \text{Area}$.

If we look up the area for $z = 1.5$, we find $0.4332$. This is also the area from $z = 0$ to $z = -1.5$ and is pictured above. If we look up the area for $z = 2.25$, we find $0.4878$ which is also pictured above. These two regions must be added to produce the total area of the shaded region from $z = -1.5$ to $z = 2.25$.

In summary, $P(-1.5 < z < 2.25) = 0.4332 + 0.4878 = 0.9210$