Standard Normal Distribution

Objectives

1. Find the area under a normal curve given z score(s)
2. Find the z scores corresponding to a given area

Continuous Distributions

Continuous Probability Distribution

A **continuous probability distribution** is a probability distribution in which the observations are continuous variables.

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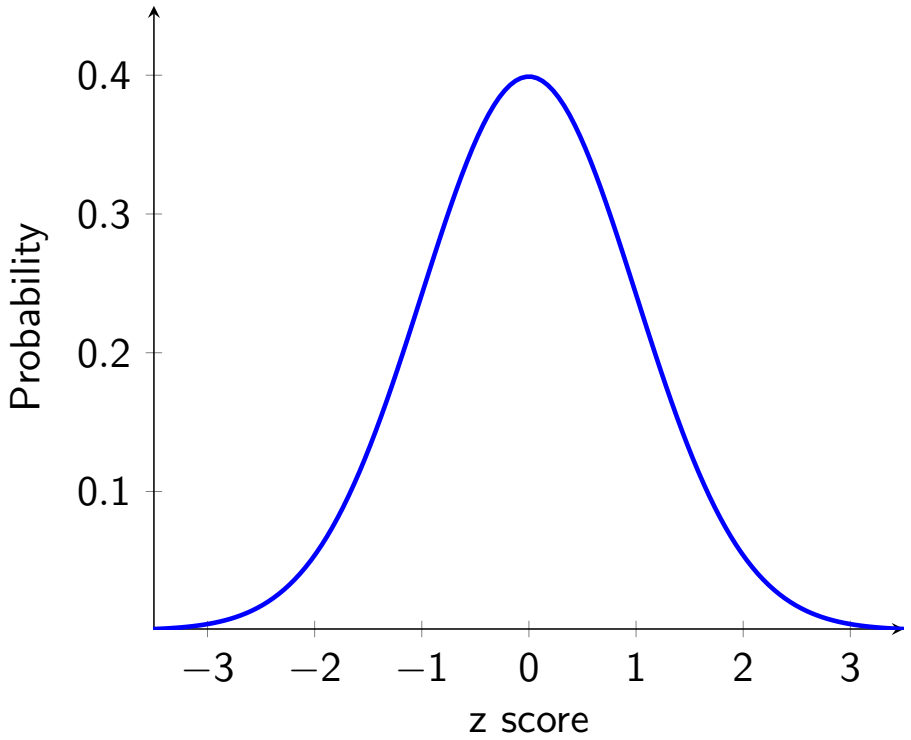
In this section, we are going to discuss the **standard normal distribution**, whose histogram resembles a bell-shaped curve.

Equation and Graph of Standard Normal Distribution

$$f(z) = \frac{1}{\sqrt{2\pi}} e^{-z^2/2}$$



Properties of the Standard Normal Distribution

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- The graph is symmetric about the mean
- The area under the curve represents the probability of obtaining a z score in that area.
- The total area under the curve equals 1

Example 1

Find the area under the curve to the left of each of the following z scores.

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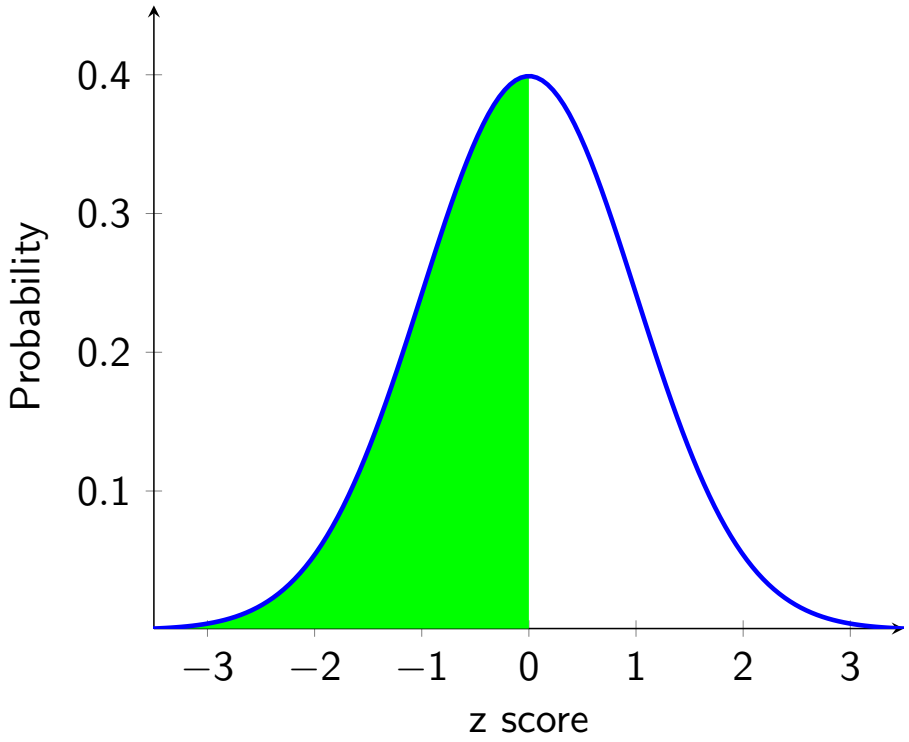

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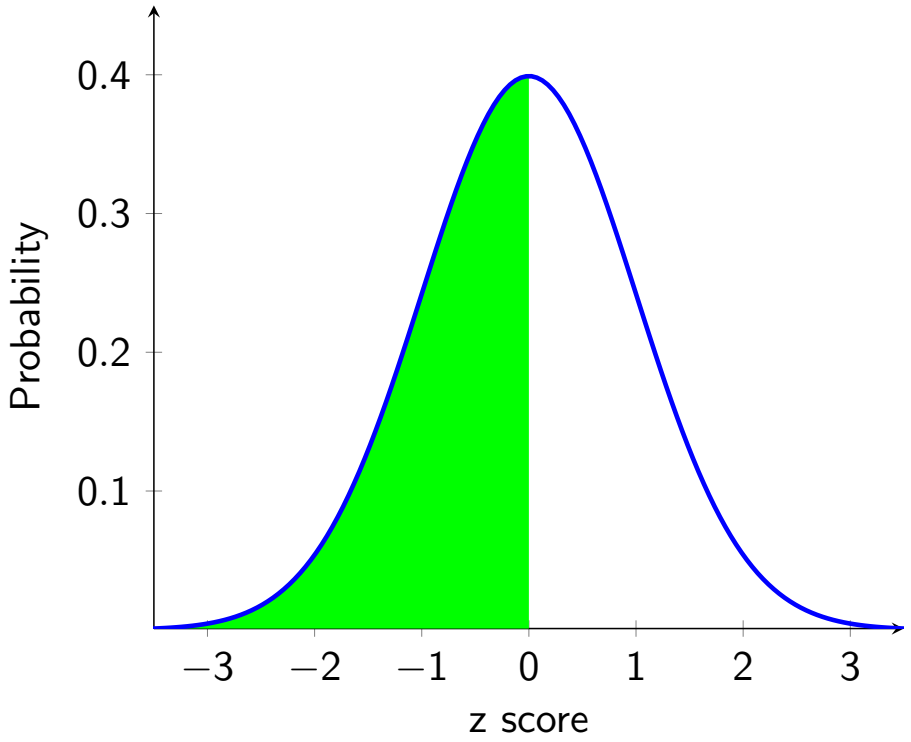

0.5

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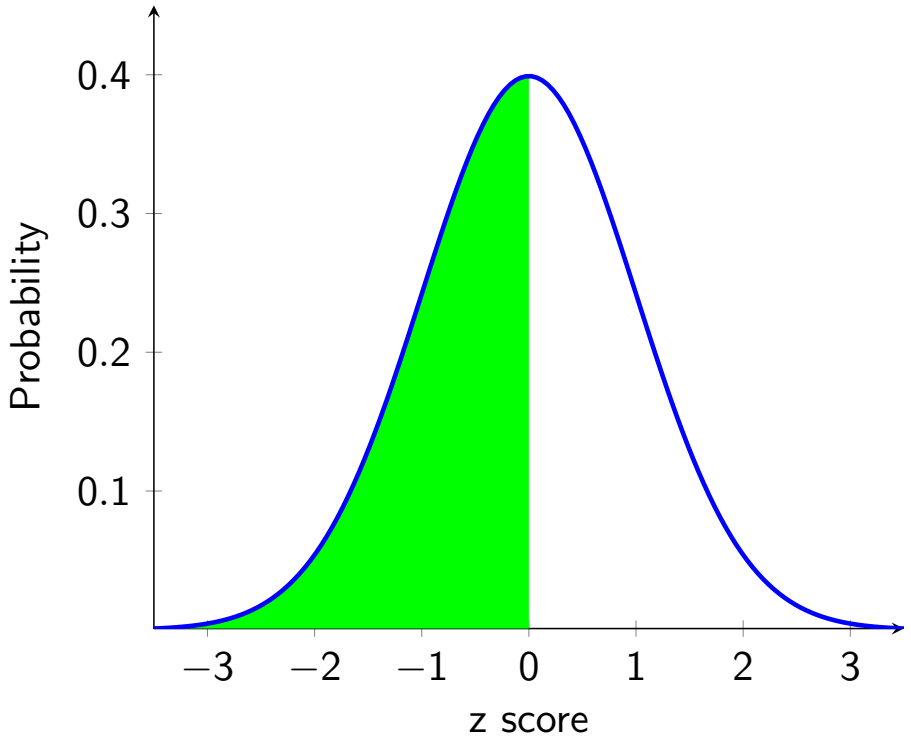
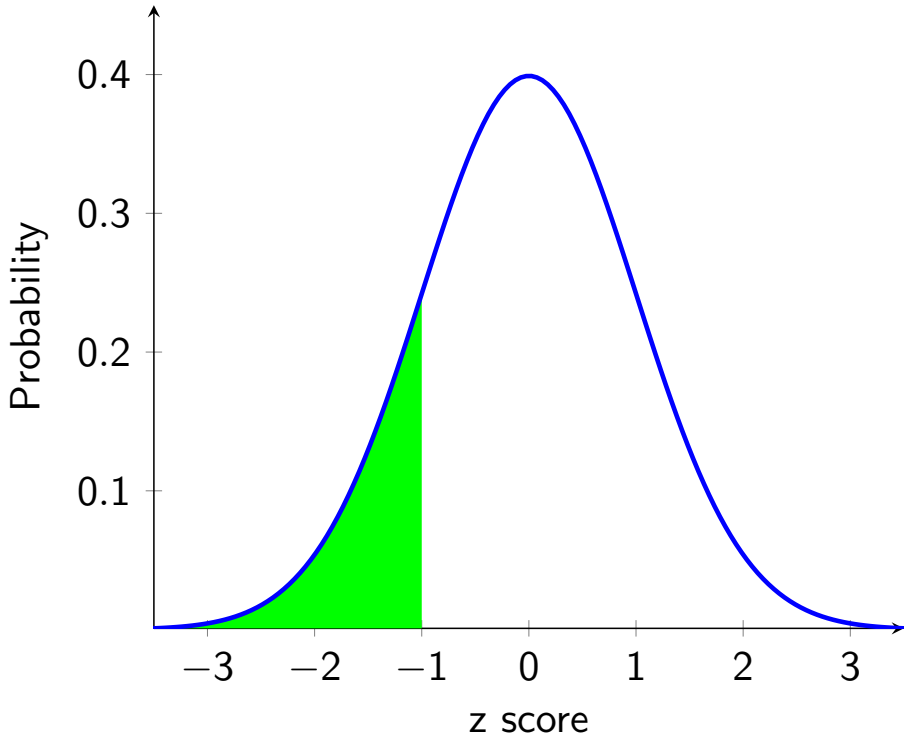


0.5

$P(z \leq 0) = 0.5$

Example 1

(b) $z = -1$



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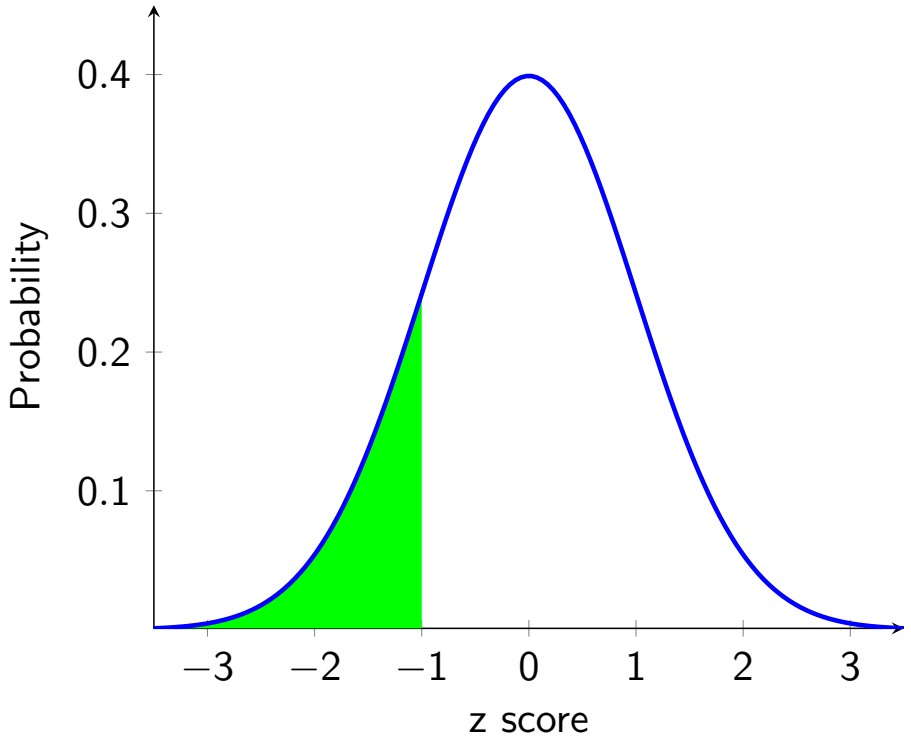

0.1587

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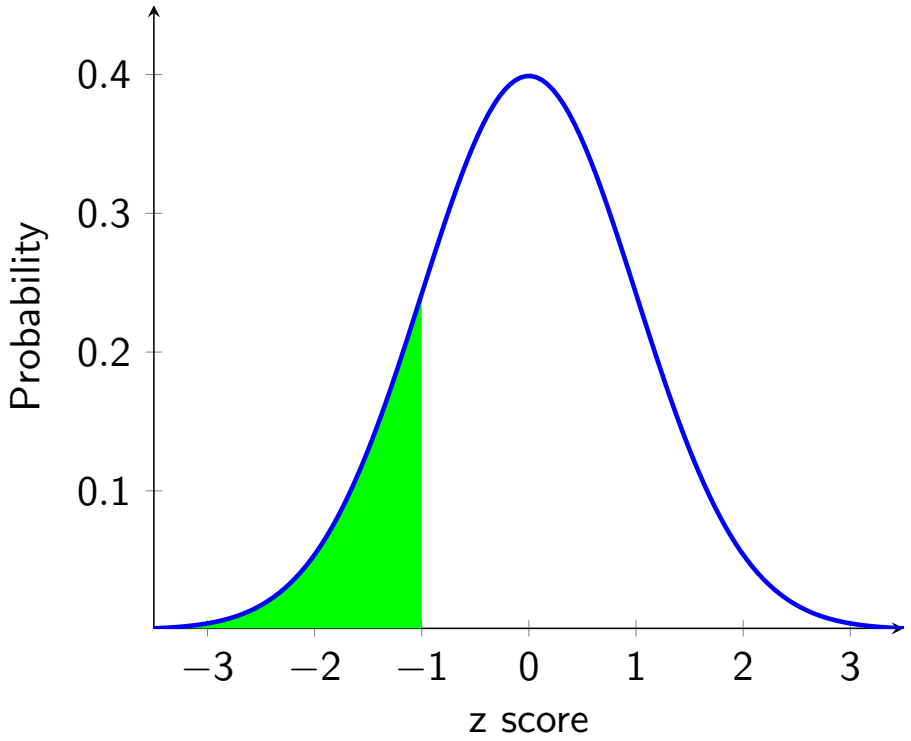

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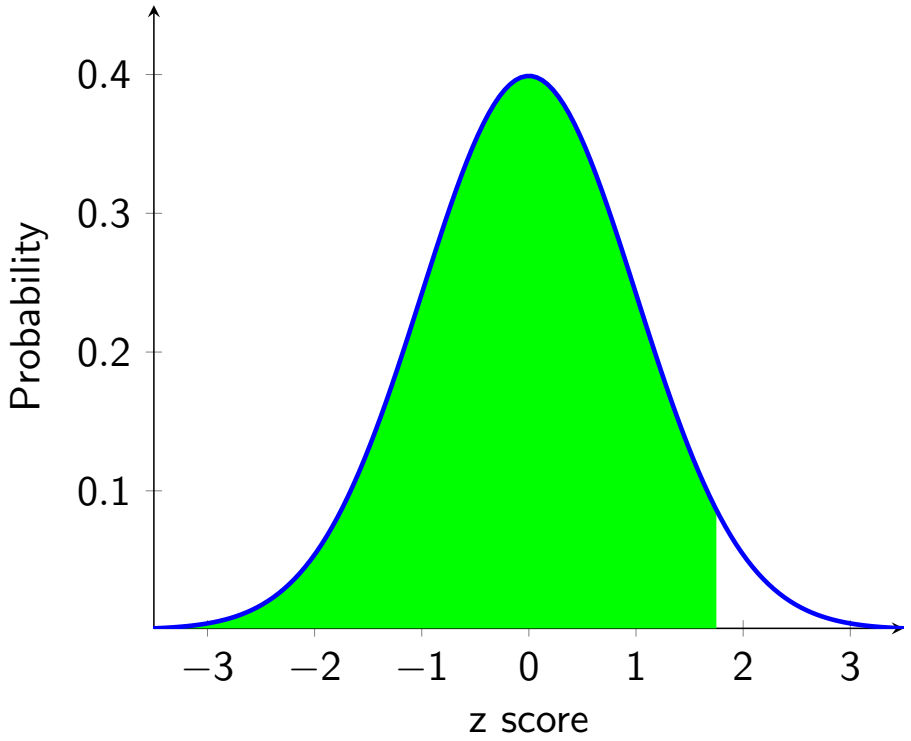
$P(z \leq -1) =$ 0.1587

Example 1

(c) $z = 1.75$



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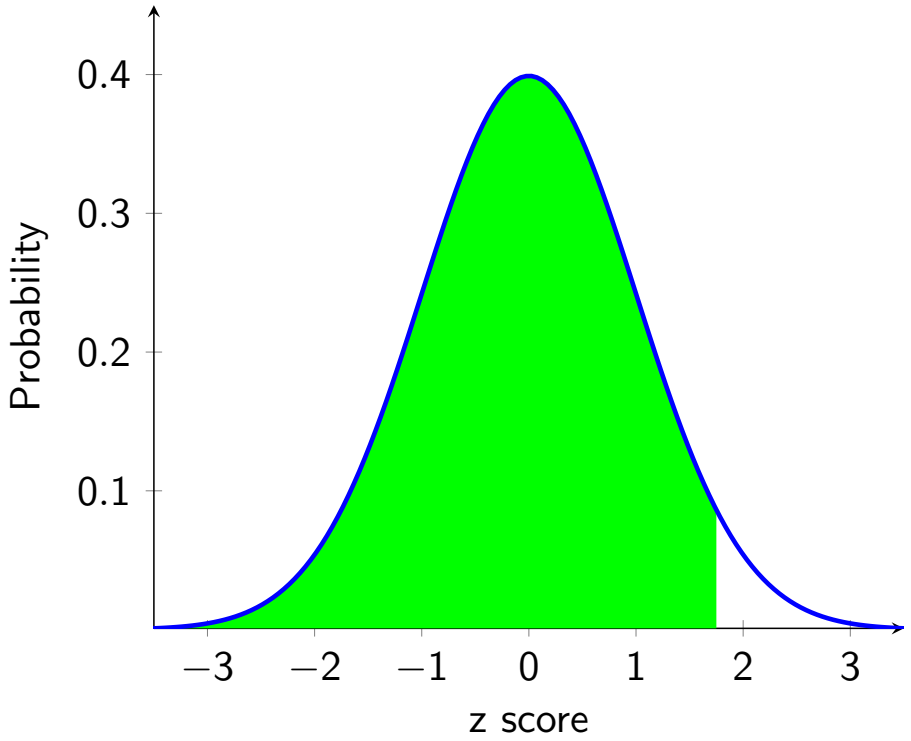

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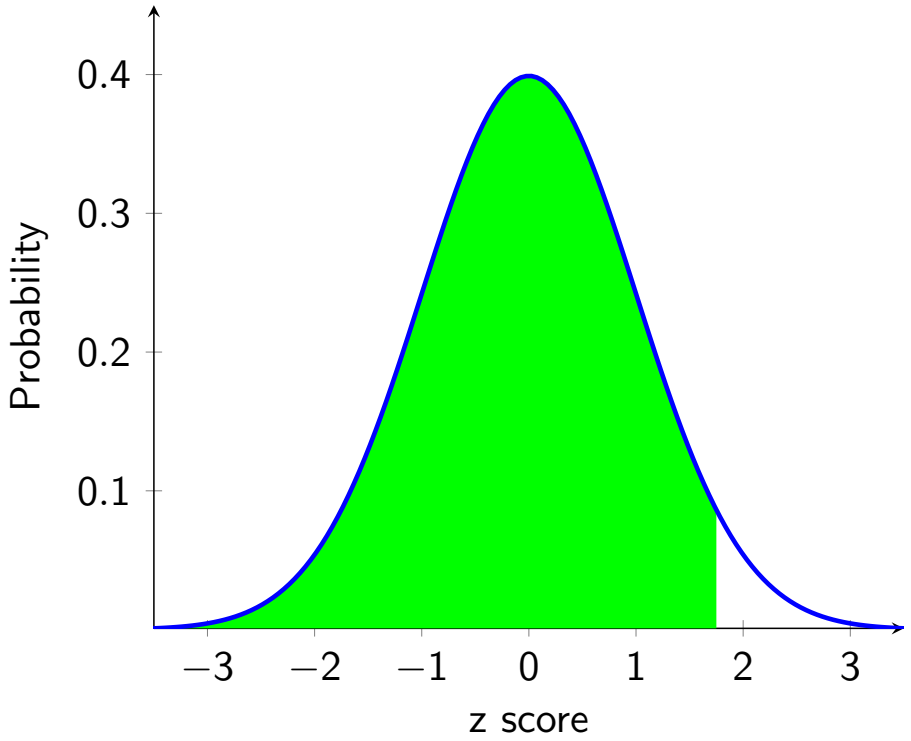

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$P(z \leq 1.75) =$ 0.9599

Example 2

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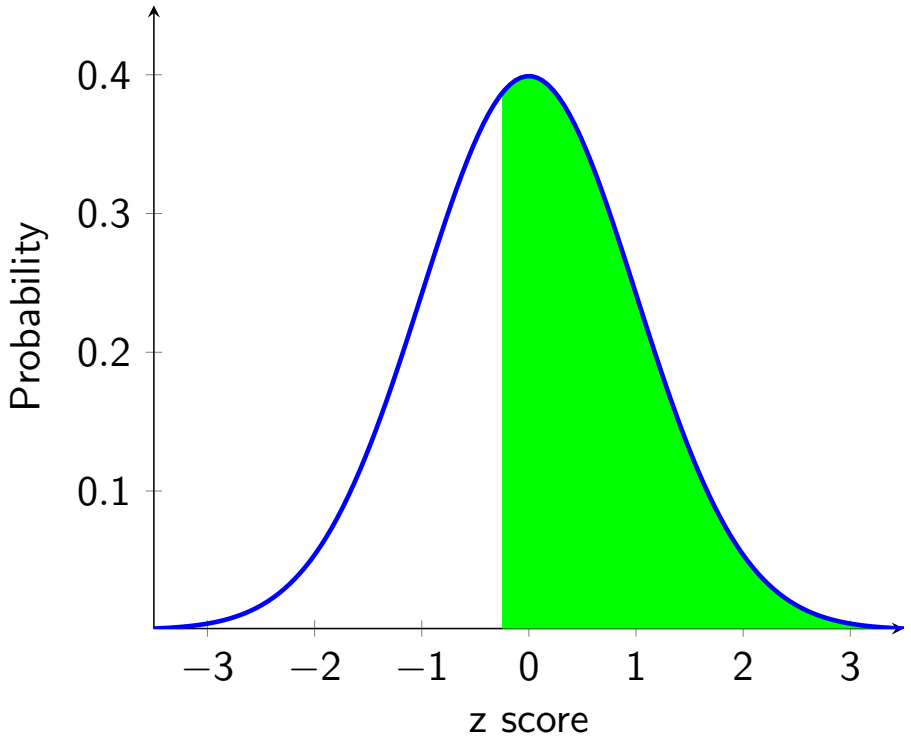

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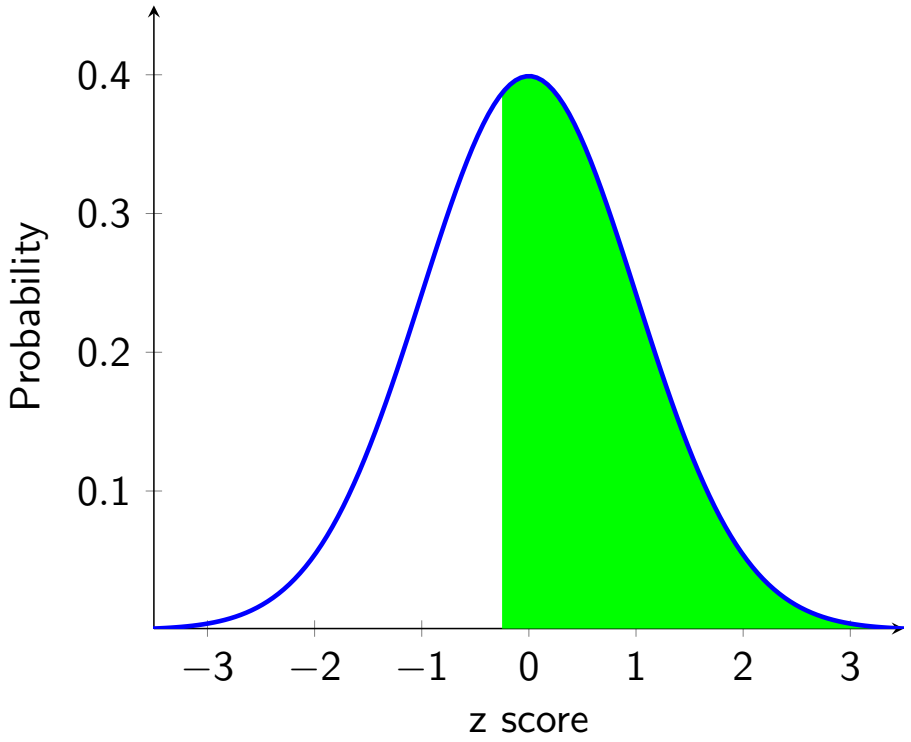

0.5987

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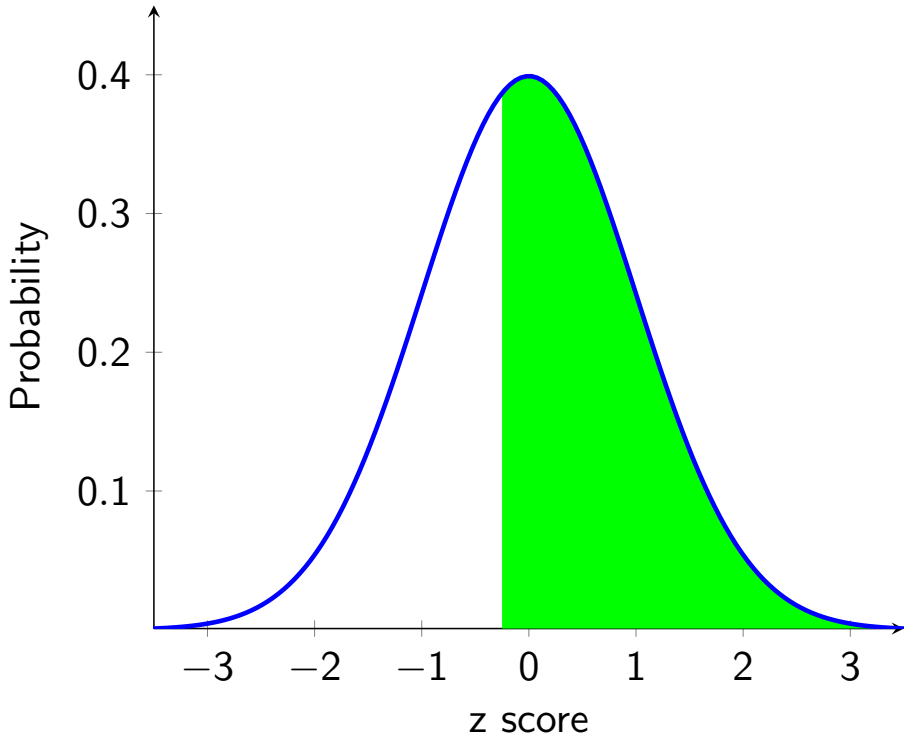

0.5987

$P(z \geq -0.25) =$ 0.5987

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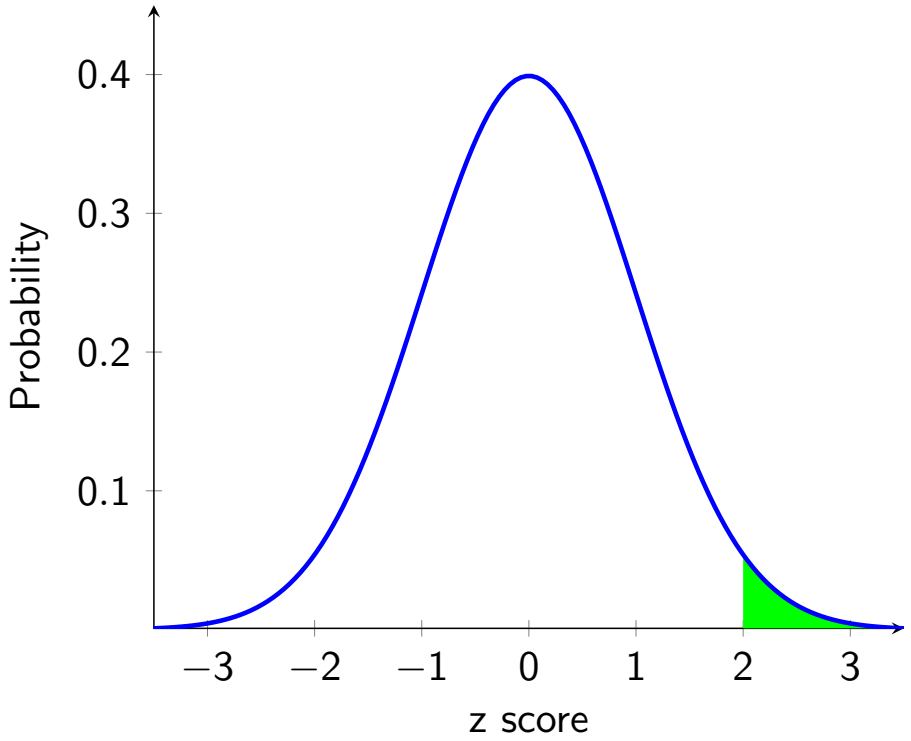

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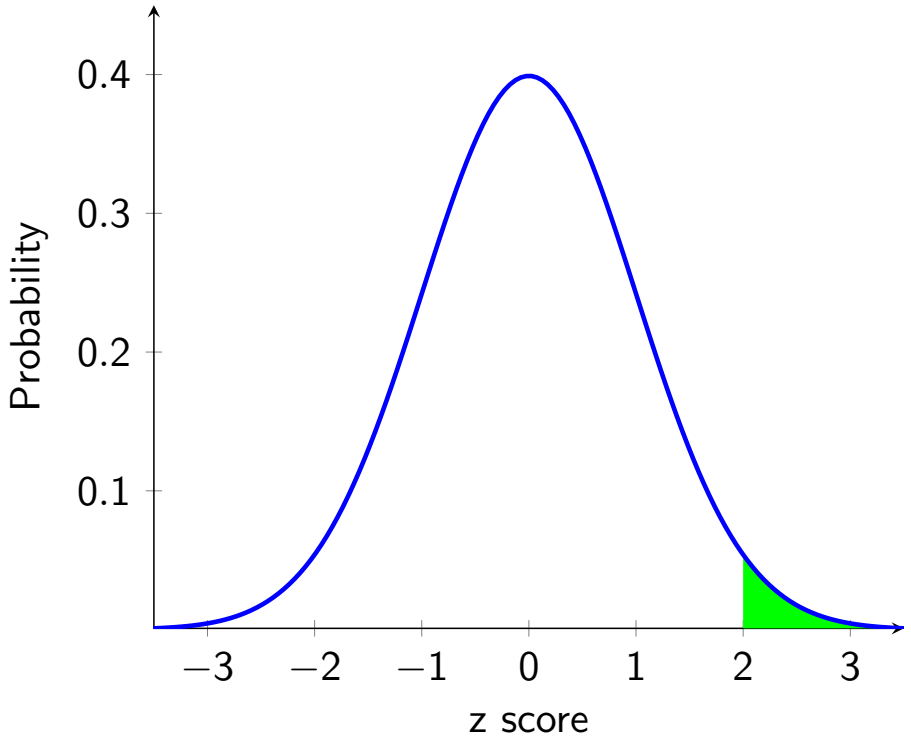

0.0228

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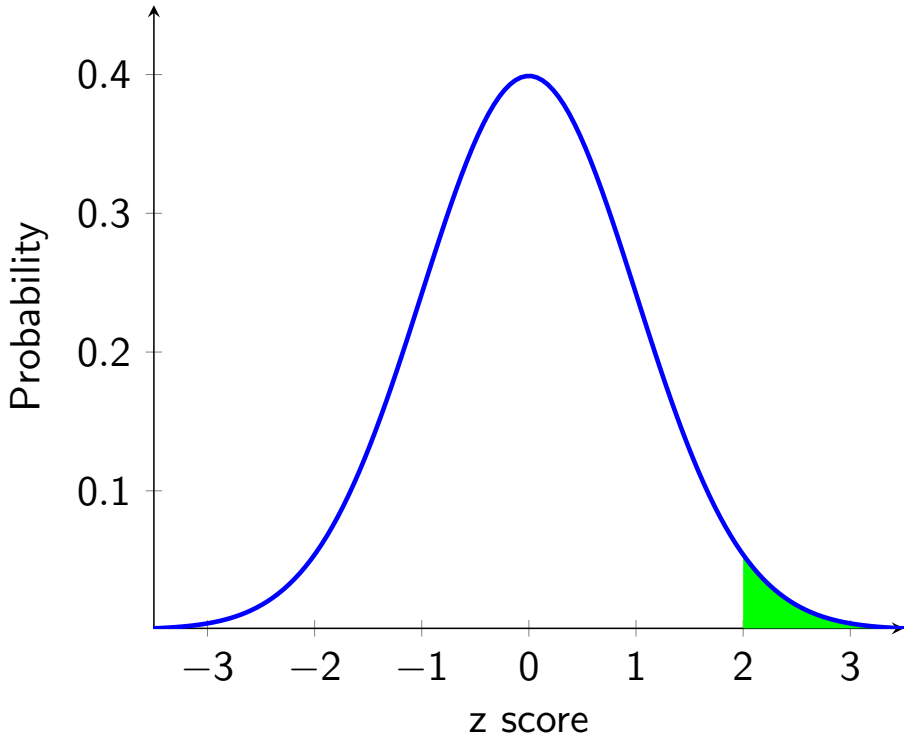

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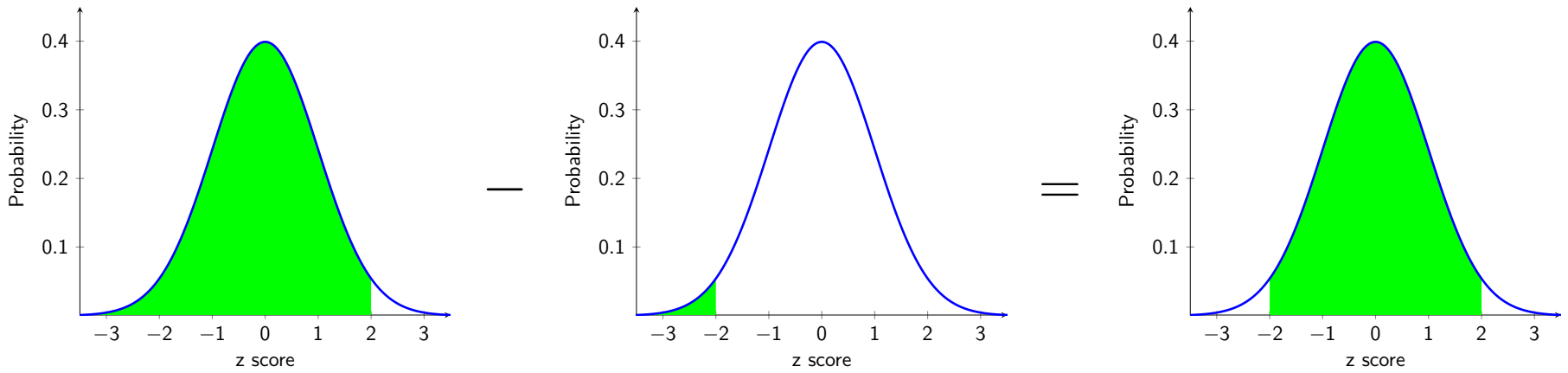
$P(z \geq 2) = 0.0228$

Finding the Area Between Two z Scores



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