PSYC 51.09: Problem Set 1

Overview

This problem set is intended to solidify the concepts you learned about in this week's lectures and readings. *After attempting each question on your own*, you are encouraged to work together with your classmates in small groups, and/or to post and answer questions on the course's Canvas site.

Please upload your problem set to Canvas (as a Word or PDF file) before the due date. No late submissions will be accepted.

Readings and ungraded questions

1. Read Chapter 1 of *Foundations of Human Memory*. What were your thoughts on the reading? **(Ungraded)**
2. Optional: read Tulving (1972)'s highly influential book chapter on Episodic and Semantic memory **(Ungraded)**
3. Optional: watch the movie Momento (2000). **(Ungraded)**

Graded questions

1. Describe one aspect of memory that you are absolutely certain is true. Explain how you know– be as specific as possible. **(2-3 paragraphs)**
2. How might you study each the following types of memory? Describe (briefly!) an experiment for each. Also describe what you think your proposed experiment can and can't tell you about that type of memory.

   (a) Memory for autobiographical events (e.g., what did you do last Tuesday?)

   (b) Memory for spatial locations (e.g., where you put your cell phone?)

   (c) Memory for facts (e.g., when was Dartmouth founded?)

   (1-2 paragraphs per type of memory, clearly delineated under different headings)
3. Life on the planet *Thear* is nearly identical to life on planet Earth, but with one key difference. Notably, ionizing radiation from the nearby binary star system interacts with a type of dense atmospheric quantum fog found only on Thear. These quantum interactions occasionally disrupt memory. In particular, each morning at the precise start of sunrise, all memories from one day (selected at random) from each person's past are heavily modified so as to become completely unrecognizable from the original memories. Therians are oblivious to this process as it is happening– the modified memories still "feel" just as real as unmodified memories, and Therians don't know which memory might have been altered on any given day. Could human Thearian society still function? How might you expect the human experience on Thear to differ from the human experience on Earth? Explain your reasoning and state any assumptions. **(2-3 paragraphs)**

Recap

- Recognition memory
- Hits
- Misses
- False Alarms
- Correct rejections

Let’s build a model:

Strength theory

CAT – strong! (STRENGTH = 15)

ALABASTER – weak! (STRENGTH = 4)

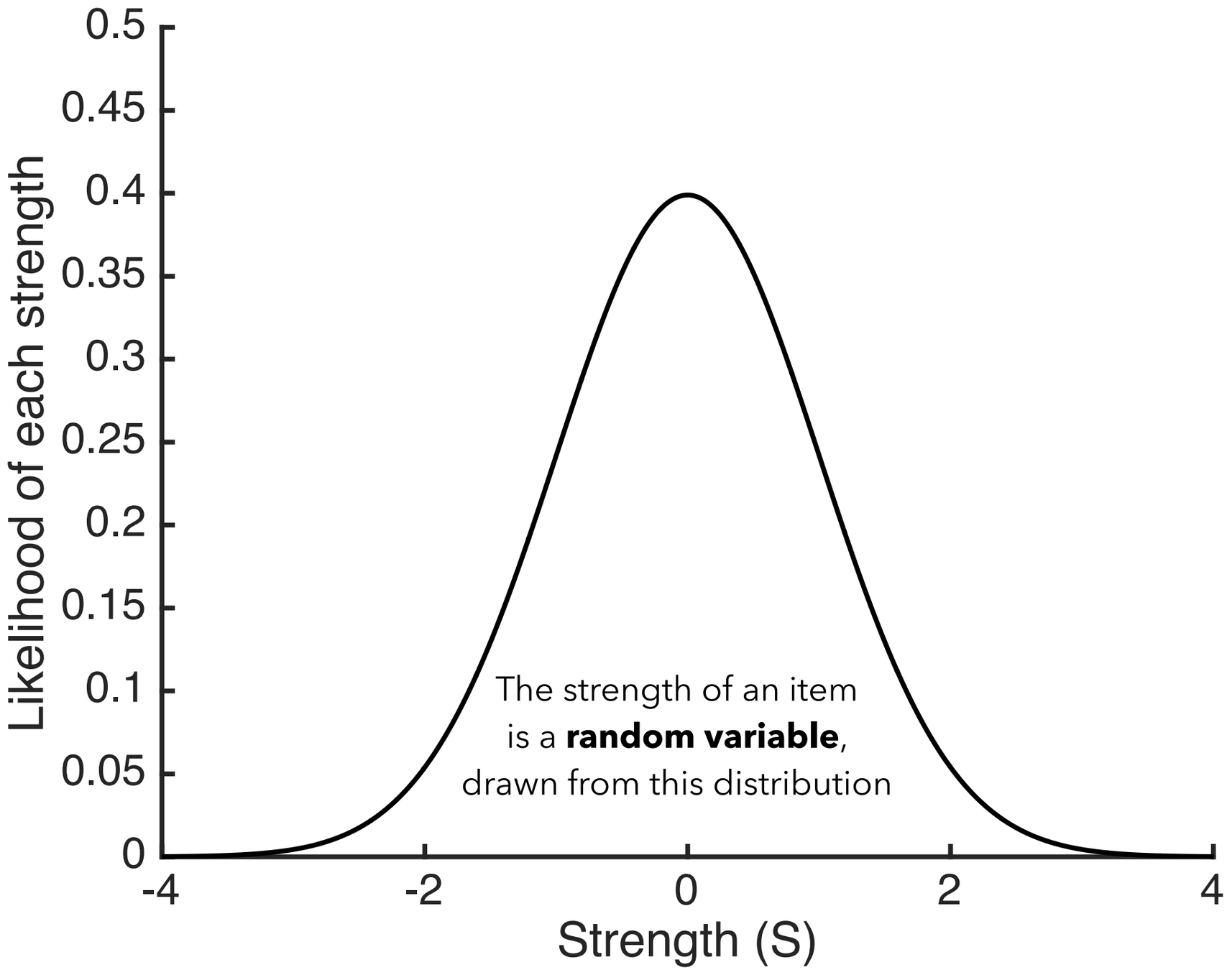
VACUUM – middle (STRENGTH = 10)

Distributions (of strengths)

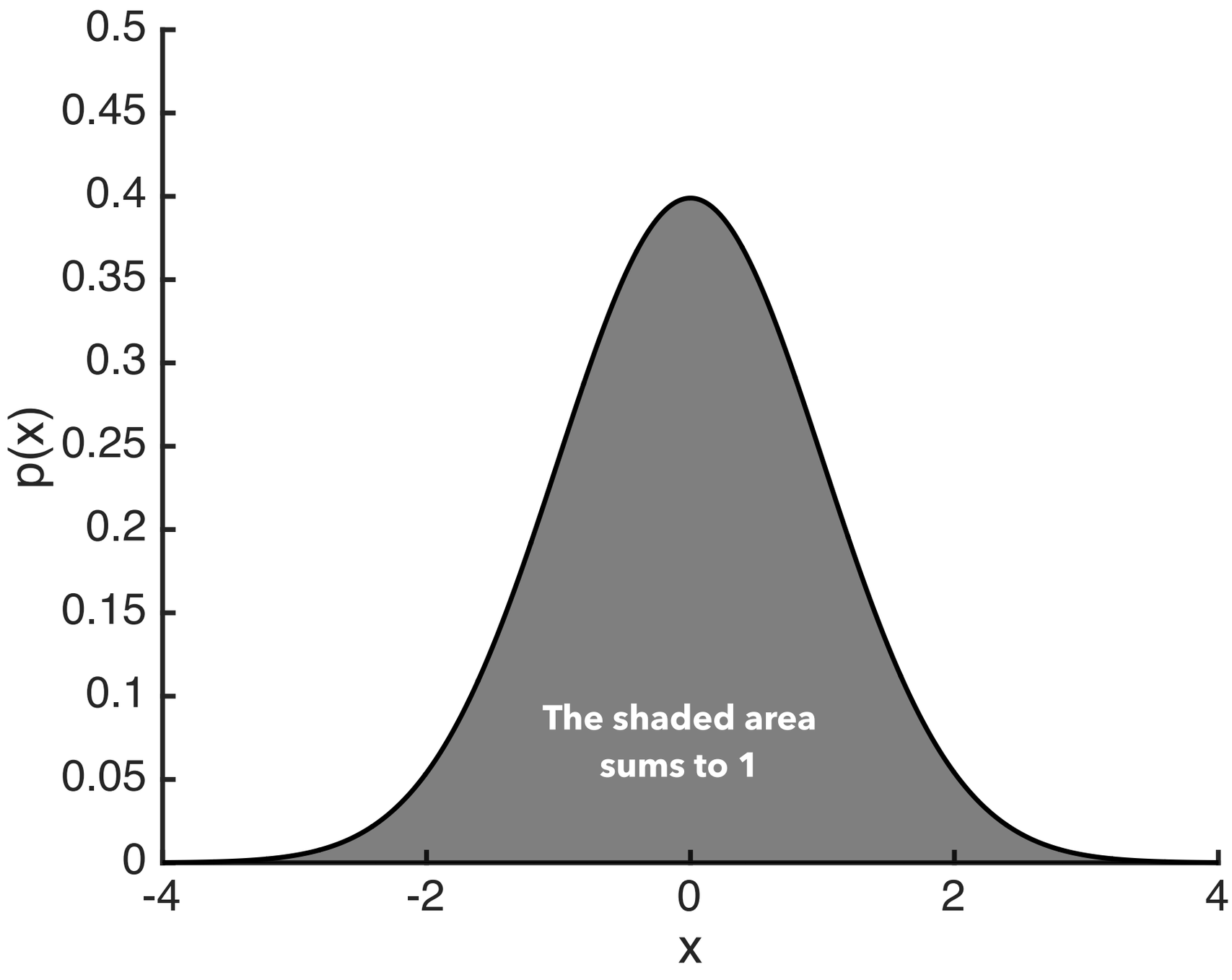
- If we can't measure word strengths, how can we figure out the predictions of strength theory?

- We can start with a few assumptions and build from there:
  - We don't know the strength of any particular word, but we know (assume) that different words have different strength values
  - We can use statistical concepts to describe how these strength values might be distributed

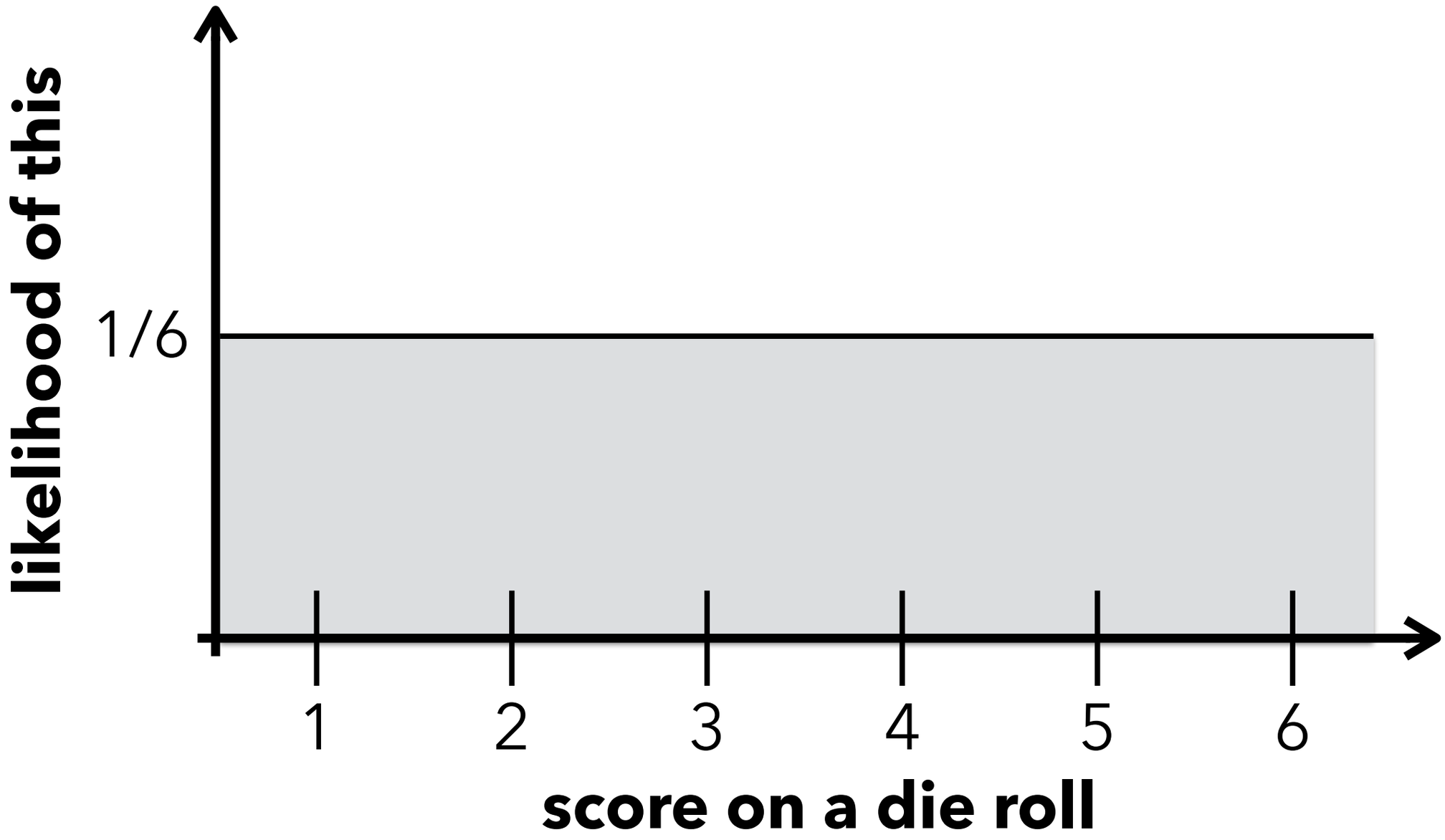
Strength distribution



Probability density function

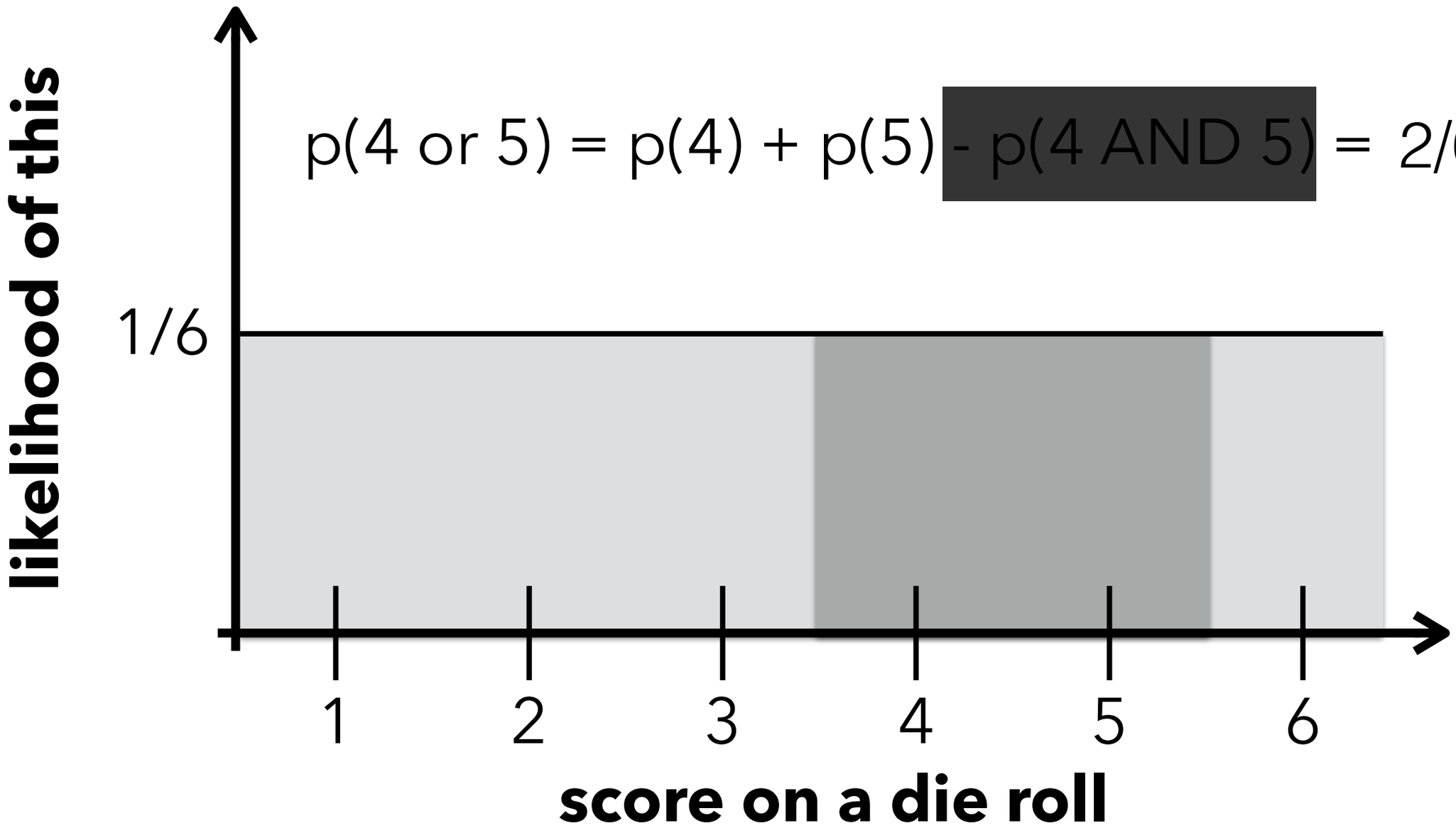


Probability density function

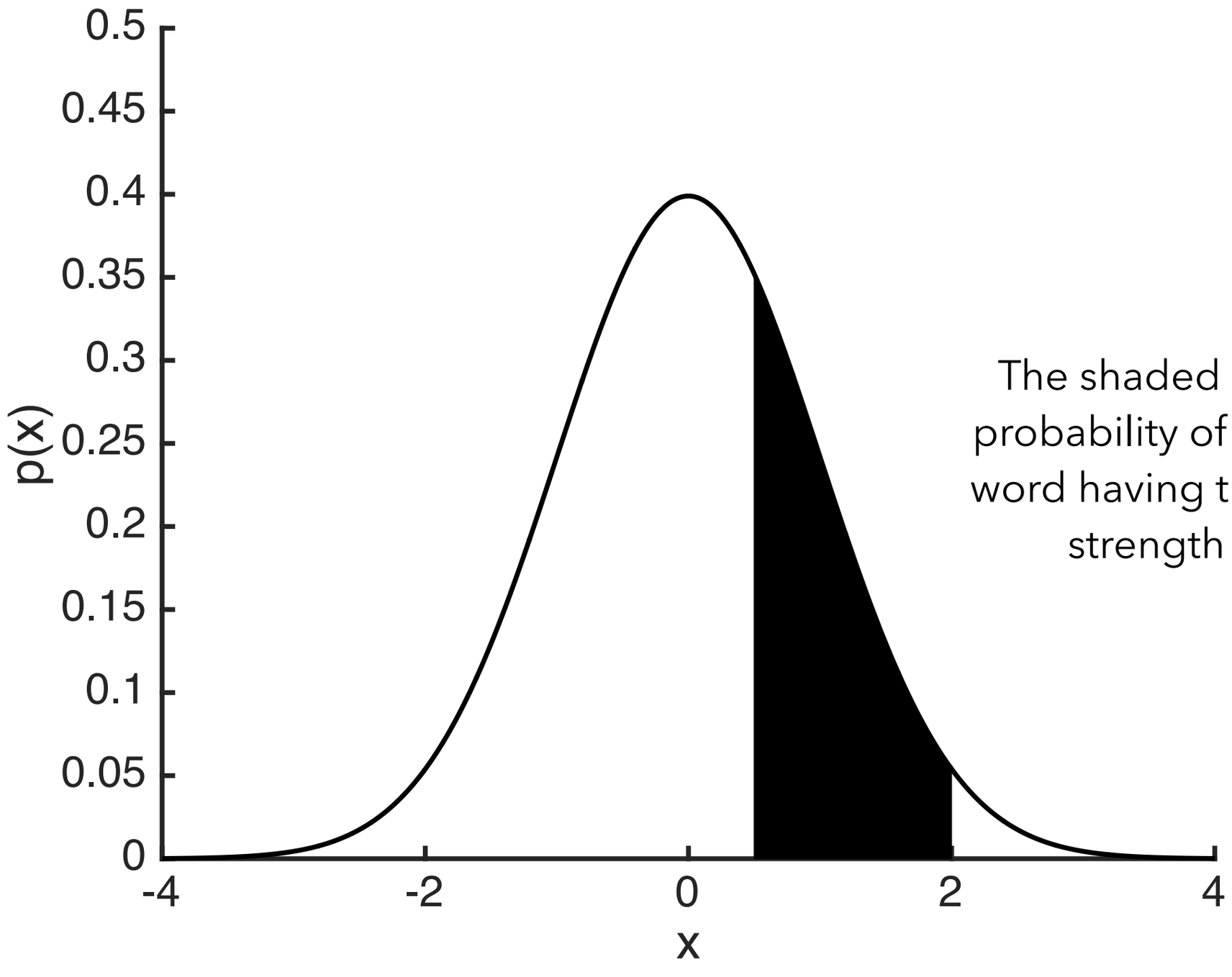


Probability of getting a 4 or 5?

p(4 or 5) = p(4) + p(5) - p(4 AND 5) = 2/6

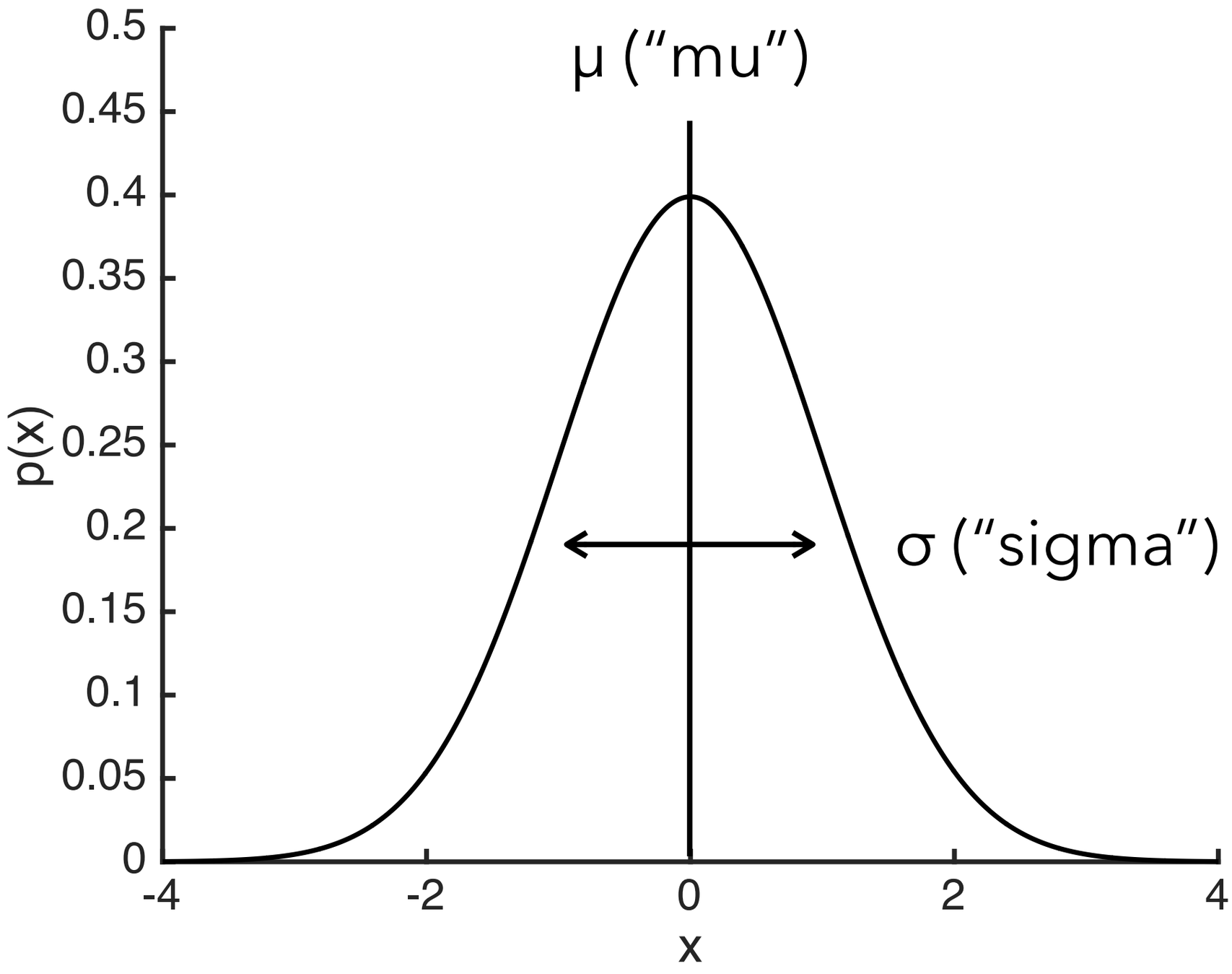


Continuous variables

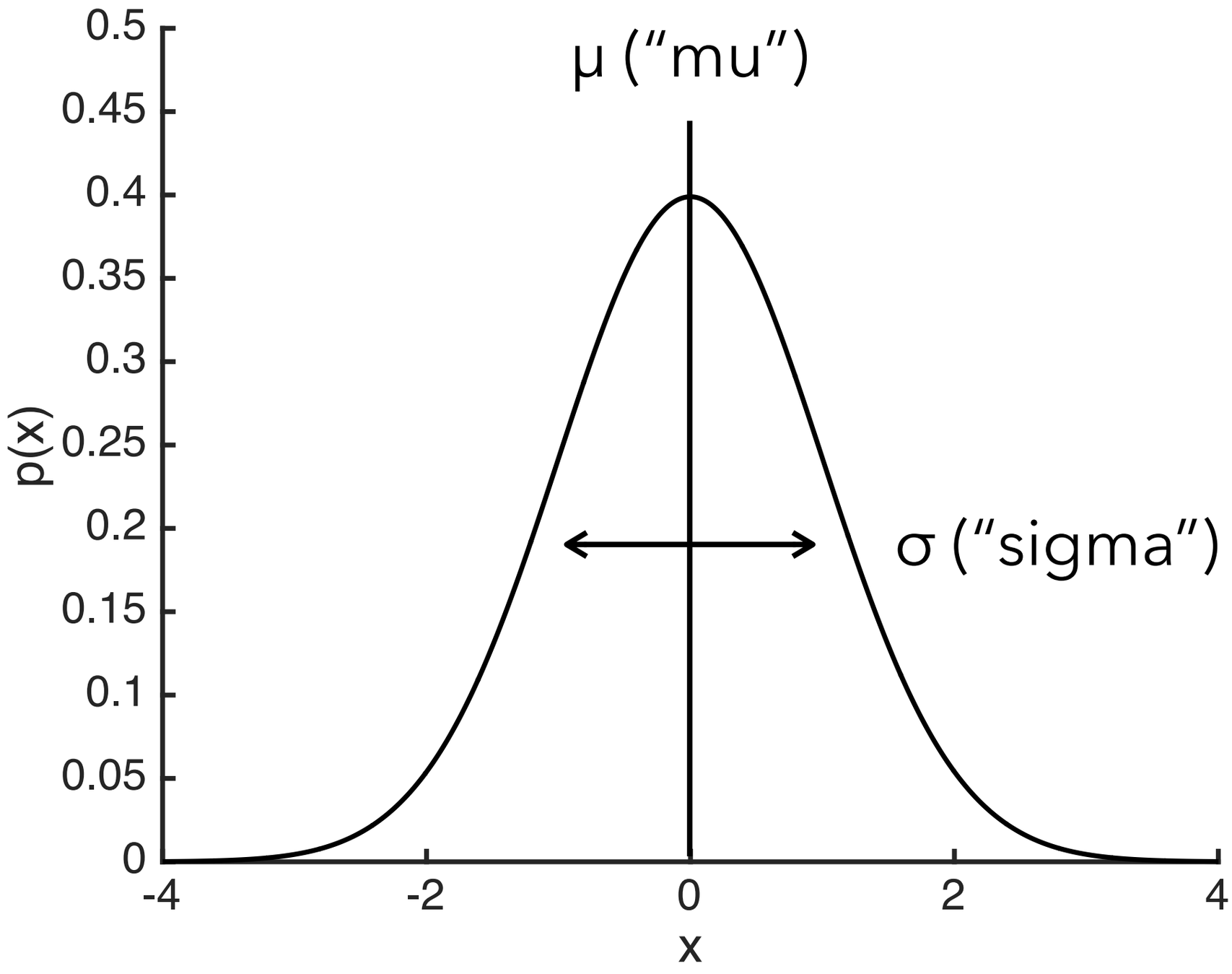


The shaded area is the probability of a particular word having this range of strength values

Gaussian distribution



What's the probability that x > μ?



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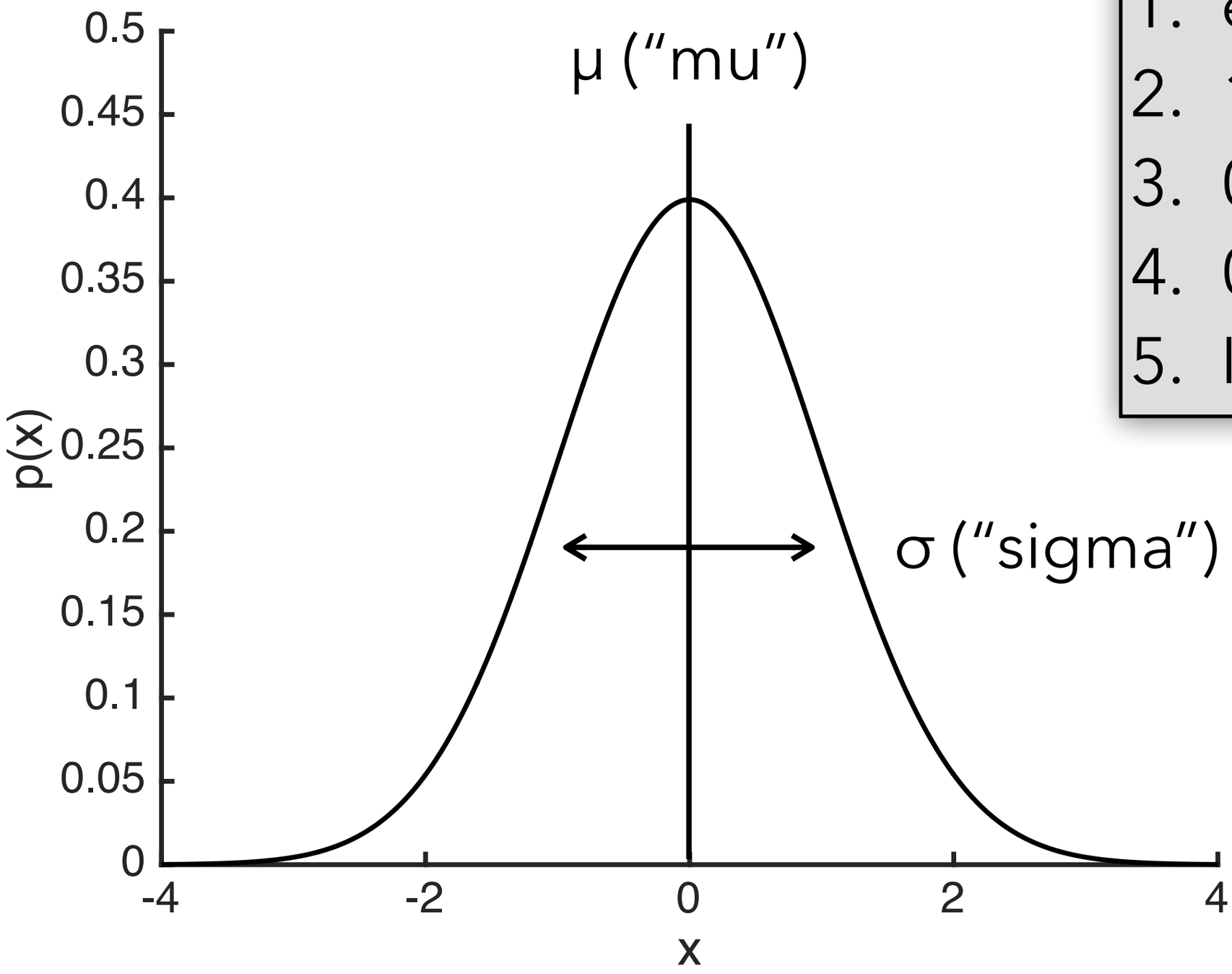
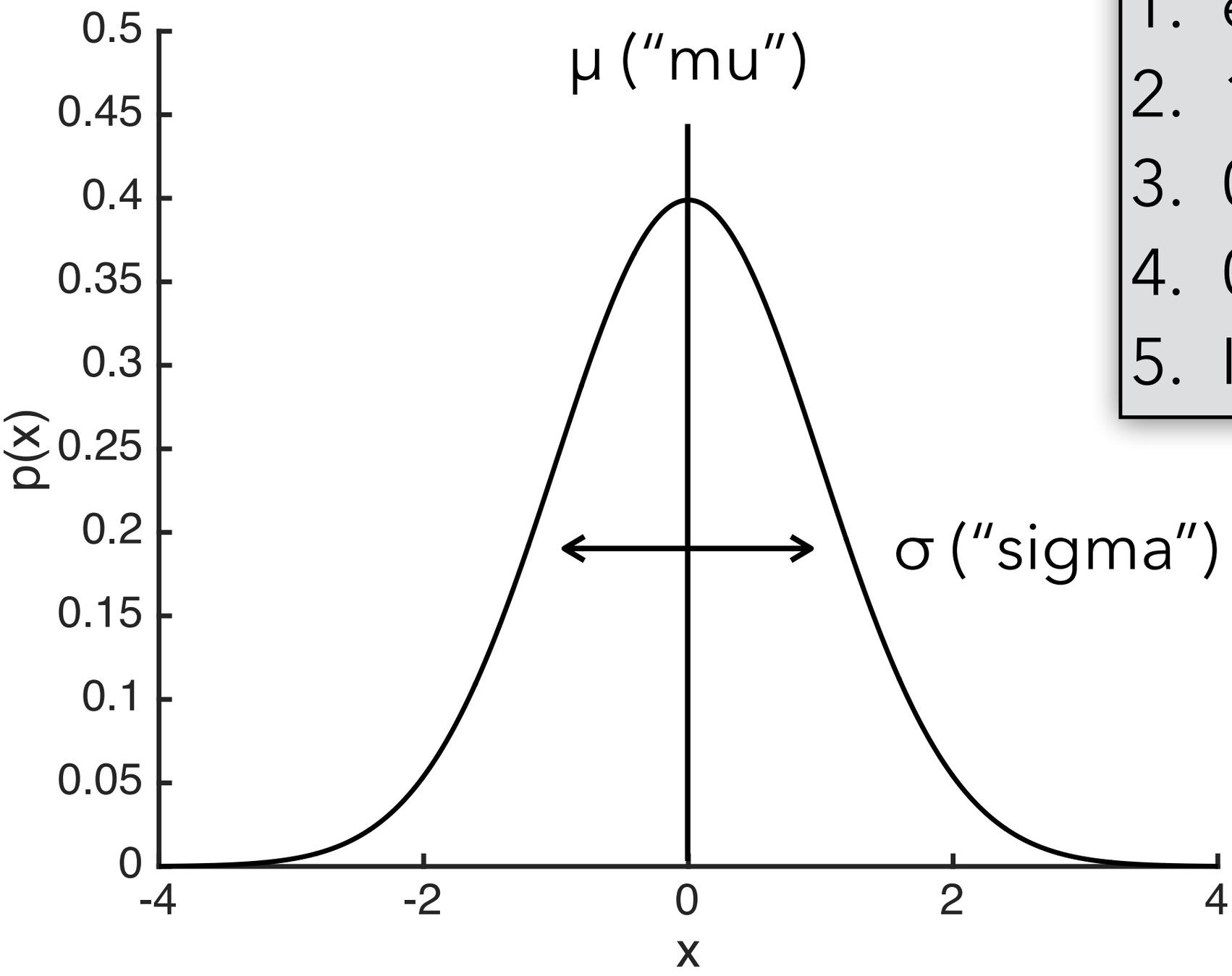


1. e
2. 1
3. 0.5
4. 0.68
5. I need more info!

What's the area under the curve for all values greater than μ?



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