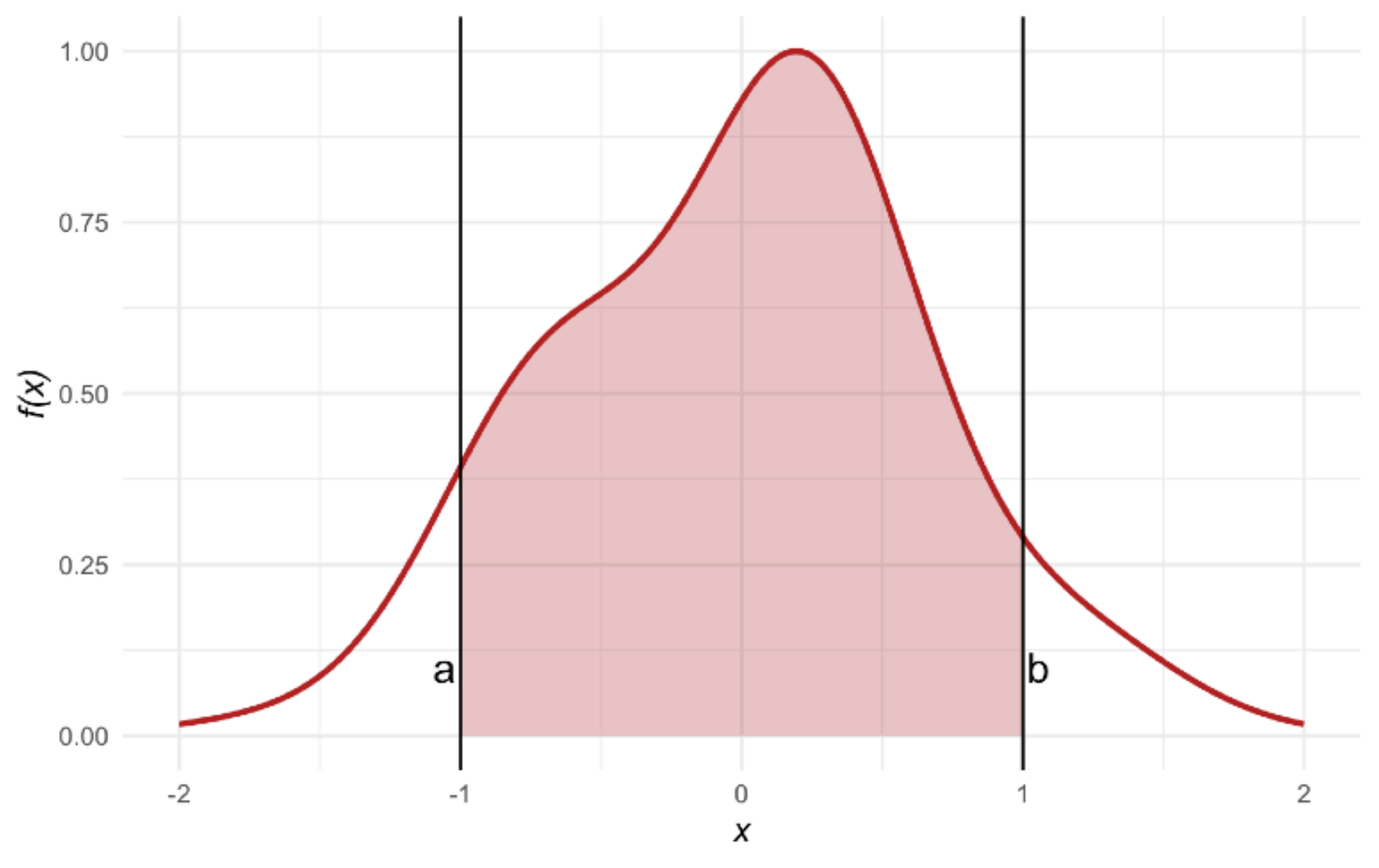
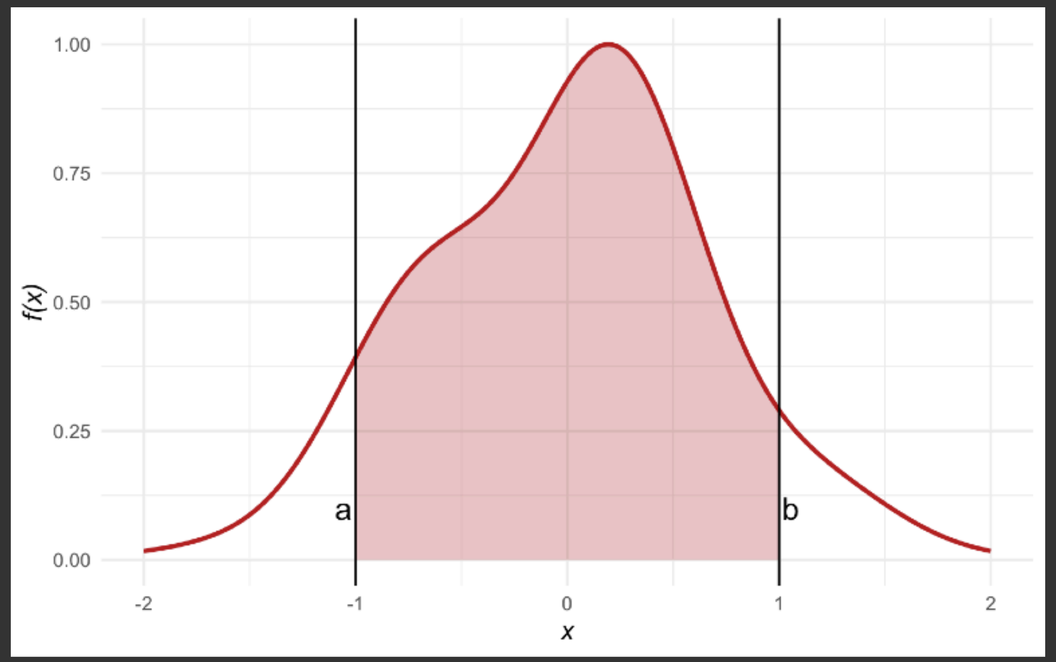
probability density function


1.00
0.75
0.50
0.25
0.00
f(x)
a
b
-2
-1
0
1
2
x

probability density function



For $f(x)$ to be a legitimate pdf, it must satisfy the following two conditions:

1. $f(x) \geq 0$ for all values of x
2. $\int_{-\infty}^{\infty} f(x)dx = 1$ i.e. area under the entire graph of $f(x) = 1$

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exercise 1

Let X be a continuous random variable with probability density function $f(x) = 3x^2, \quad 0 \leq x \leq 1$

(a) Verify that $f(x)$ is a valid probability function

(b) What is $P\,(1/2 \leq X \leq 1)$?

(c) What is $P(X = 1/2)$?

exercise 2

Let X be a continuous random variable with probability density function $f(x) = \dfrac{x^3}{4}$ for $0 \leq X \leq c$.

What is the value of the constant c that makes $f(x)$ a valid probability density function?