

# Untitled

```
-- Attaching core tidyverse packages ----- tidyverse 2.0.0 --
v dplyr      1.1.4      v readr      2.1.5
v forcats    1.0.0      v stringr    1.5.1
v ggplot2    3.5.1      v tibble     3.2.1
v lubridate  1.9.3      v tidyr      1.3.1
v purrr      1.0.2

-- Conflicts ----- tidyverse_conflicts() --
x dplyr::filter() masks stats::filter()
x dplyr::lag()     masks stats::lag()
i Use the conflicted package (<http://conflicted.r-lib.org/>) to force all conflicts to become explicit
Registered S3 method overwritten by 'mosaic':
  method      from
  fortify.SpatialPolygonsDataFrame ggplot2
```

The 'mosaic' package masks several functions from core packages in order to add additional features. The original behavior of these functions should not be affected by this.

Attaching package: 'mosaic'

The following object is masked from 'package:Matrix':

mean

The following objects are masked from 'package:dplyr':

count, do, tally

The following object is masked from 'package:purrr':

`cross`

The following object is masked from 'package:ggplot2':

`stat`

The following objects are masked from 'package:stats':

`binom.test, cor, cor.test, cov, fivenum, IQR, median, prop.test, quantile, sd, t.test, var`

The following objects are masked from 'package:base':

`max, mean, min, prod, range, sample, sum`

Attaching package: 'infer'

The following objects are masked from 'package:mosaic':

`prop_test, t_test`

## Warm up

**Example:** You are testing seeds from a new plant variety. You plant 10 seeds ( $n=10$ ) and observe that 3 of them successfully germinate ( $k=3$ ). Consider two hypotheses about the true germination probability ( $p$ ) for this variety:

Hypothesis A:

Hypothesis B:

Given you observed 3 germinations out of 10 seeds, which hypothesis (A or B) is more supported by the data?

In general, the *likelihood* of seeing  $X = 3$  given  $p$  is:

3 ways of finding the maximum:

1. Approximate solution graphically

```
germ_function <- function(p) {choose(10,3) * p^3 * (1-p)^7} # define function
ggplot() +
  geom_function(fun = germ_function) +
  xlim(c(0,1))
```

