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 1.9.4     v tidyr     1.3.1
v purrr     1.0.4
-- 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 becom
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))
```