HW 12 – Math 58B

due Thursday, April 23, 2026

your name here

```
library(tidyverse)
library(infer)
library(broom)   # includes the tidy() function
library(praise)
```

Assignment Summary (Goals)

- SE of b_1
- Inference on β_1

The HW assignment is based on a sample of births in 2014 from a large database put out by the US Department of Health and Human Services, Centers for Disease control.

```
library(openintro)
data(births14)
```

Q1. Father's age, randomization.

Using a randomization test (use **infer** syntax) to model baby's weight as a linear function of father's age, answer the following two questions: * Is the linear relationship discernible? (you'll need to calculate a p-value) * What is the approximate SE of the slope coefficient?

Code is slightly different from what you've seen before. I've scaffolded below, but you should be able to tell what is going on!

Don't forget to set a seed so that your results are reproducible.

```
# first LOOK at the raw ouput:
___ |>
  specify(___ ~ ___) |>
  fit()
```

```
# then collect the value you want
obs_slope<- ___ |>
  specify(___ ~ ___) |>
  fit() |>
  filter(term == "___") |>   # use only the b1 row
  select(___) |>             # select only the 2nd column
  pull()                     # to get a scalar


null_slopes <- ___ |>
  specify(___ ~ ___) |>
  hypothesize(null = "independence") |>
  generate(reps = 1000, type = "permute") |>
  fit() |>
  filter(term == "___") |>   # use only the b1 rows
  select(___)                # select only the 2nd column
  ungroup()                  # don't need reps grouped


then write your own ggplot code
```

Q2. Father's age, bootstrap

Using the boostrap (use **infer** syntax) to model baby's weight as a linear function of father's age, answer the following two questions:

- Find and interpret a 95% CI for the true population slope from the linear model which predicts baby's weight from father's age. (Use words like "weight" and "father's age" in your interpretation.)
- What is the approximate SE of the slope coefficient?

Q3. Father's age, mathematical model.

Use the mathematical model to answer the following three questions:

- Is the linear relationship discernible? (you'll need to calculate a p-value)
- Find and interpret a 95% CI for the true population slope from the linear model which predicts baby's weight from father's age. (Use words like "weight" and "father's age" in your interpretation.)
- What is the approximate SE of the slope coefficient?

Hint: the `tidy()` function has an argument which is `conf.int = TRUE`.

```
praise()
```

```
[1] "You are luminous!"
```