

Name:

Date:

## Quiz #11

```
penguins2 <- penguins %>%  
  drop_na() %>%  
  filter(species %in% c("Adelie", "Chinstrap"))  
  
penguins2 %>%  
  group_by(species) %>%  
  mutate(sex = sample(sex,  
                      size = length(sex),  
                      replace = TRUE))  
  
penguins2 %>%  
  group_by(species) %>%  
  summarize(prop_male = sum(sex == "male") / n())  
  
penguins2 %>%  
  mutate(species = sample(species,  
                          size = length(species),  
                          replace = FALSE))
```

There are four code chunks above. Which of the code chunks are steps in the following three operations?

- **Calculating a test statistic**
- **Permuting a data set for hypothesis testing**
- **Bootstrapping a data set for estimating confidence intervals**