HW3\_Group1\_Austin Halvorsen

Pedram Jahangiry

Sep 22 2020

# Problems

## Question 1

library(dplyr)

##   
## Attaching package: 'dplyr'

## The following objects are masked from 'package:stats':  
##   
## filter, lag

## The following objects are masked from 'package:base':  
##   
## intersect, setdiff, setequal, union

library(tidyverse)

## ── Attaching packages ──────────────────────── tidyverse 1.3.0 ──

## ✓ ggplot2 3.3.2 ✓ purrr 0.3.4  
## ✓ tibble 3.0.3 ✓ stringr 1.4.0  
## ✓ tidyr 1.1.2 ✓ forcats 0.5.0  
## ✓ readr 1.3.1

## ── Conflicts ─────────────────────────── tidyverse\_conflicts() ──  
## x dplyr::filter() masks stats::filter()  
## x dplyr::lag() masks stats::lag()

library(wooldridge)  
  
## Make the data frame  
family <- data.frame(family = 1:10, monthly\_expense = c(300,440,350,1100,640,480,450,700,670,530))

### (i)

Find the average monthly housing expenditure.

mean(family$monthly\_expense)

## [1] 566

### (ii)

median(family$monthly\_expense)

## [1] 505

### (iii)

adj1 <- family %>%   
 mutate(  
 hundreds\_dollar = monthly\_expense / 100  
 )   
  
mean(adj1$hundreds\_dollar)

## [1] 5.66

median(adj1$hundreds\_dollar)

## [1] 5.05

### (iv)

adj2 <- family  
adj2[8,2] <- adj2[8,2] + 100  
mean(adj2$monthly\_expense)

## [1] 576

median(adj2$monthly\_expense)

## [1] 505

## Question 2

The difference between the two percentages was 3%, however the percentage change between 15% and 18% is 20%.

## Question 3

log\_salary <- 10.6 + 0.027\*(0)  
calc\_salary <- function(x){  
 exp(10.6 + 0.027 \* x)  
}

### (i)

sal0 <- calc\_salary(0)  
sal5 <- calc\_salary(5)

### (ii)

calc\_percent <- function(x){  
 (100\*0.027)\*x  
}  
  
calc\_percent(5)

## [1] 13.5

### (iii)

((sal5-sal0)/sal0)\*100

## [1] 14.45368

The exact percent change is 14.5% from the part i. Based on our approximation from part ii, we had that after 5 years experience the percentage increase would be about 13.5%.

## Question 4

### (i)

round(pnorm(6,5,2),3)

## [1] 0.691

### (ii)

round(1-pnorm(4,5,2),3)

## [1] 0.691

### (iii)

round(1-pnorm(6,5,2) + pnorm(4,5,2),3)

## [1] 0.617

## Question 5

# Writing the function  
cdf <- function(x){  
 3\*x^2 - 2\*x^3  
}   
  
1-cdf(0.6)

## [1] 0.352

### (i)

1-cdf(0.6)

## [1] 0.352

#1-pnorm(0.6)

## Question 6

### (i)

# use expected values property  
  
52.3\*1000

## [1] 52300

14.6\*1000

## [1] 14600