

### HOMWORK 3

The following problems are from your textbook. The page number refers to the page in the 4th edition. Please label the questions by page number and question number. For questions that are not from the textbook use the label "Worksheet" and then the question number.

- p198 # 2 (from Review Exercises)
- p198 # 4
- p198 # 5
- p215 # 9
- p215 # 10
- p235 # 6
- p236 # 12

Use the following data for the problems below:

$$\begin{aligned} \text{Body Fat\% :} & \text{ Average } 24\%, \text{ SD } 6\% \\ \text{BMI :} & \text{ Average } 26, \text{ SD } 5 \\ & r = 0.66 \end{aligned}$$

First, some definitions. In the following, a person is BMI-obese if their BMI is greater than or equal to 30, but is actually obese only if their Body Fat % is greater than or equal to 25%. The sensitivity of BMI is defined to be the percentage of the actually obese population that are BMI-obese, i.e

$$100 \times \frac{\text{people who actually obese and BMI-obese}}{\text{people who are actually obese}}$$

The specificity of BMI is defined to be the percentage of the people who are BMI-classified as obese that are actually obese, i.e.

$$100 \times \frac{\text{people who actually obese and BMI-obese}}{\text{people who are BMI-obese}}$$

Here are the questions!

- (1) What percentage of the population is actually obese?
- (2) What percentage of the population BMI-obese?
- (3) In the following question we compute the % of the total population that is both BMI-obese and actually obese:
  - (a) What % of people with BMI 30 are actually obese?
  - (b) What % of people have BMI between 30 and 33?
  - (c) To avoid calculus, we assume that the % of people who are actually obese and have BMI =  $x$  is the same for  $30 \leq x \leq 33$ . Using this simplification, what is the % of the total population that is actually obese and has BMI between 30 and 33?
  - (d) Repeat this for BMI between 33 and 36. What is the % of the total population that is actually obese and has BMI between 33 and 36?
  - (e) To simplify the problem further, assume that all people with a BMI above 36 are actually obese. What % of the total population is BMI-obese and actually obese?
- (4) What is the specificity of BMI?

- (5) What is the sensitivity of BMI?
- (6) What are the strengths and weaknesses of BMI as a measurement of obesity?