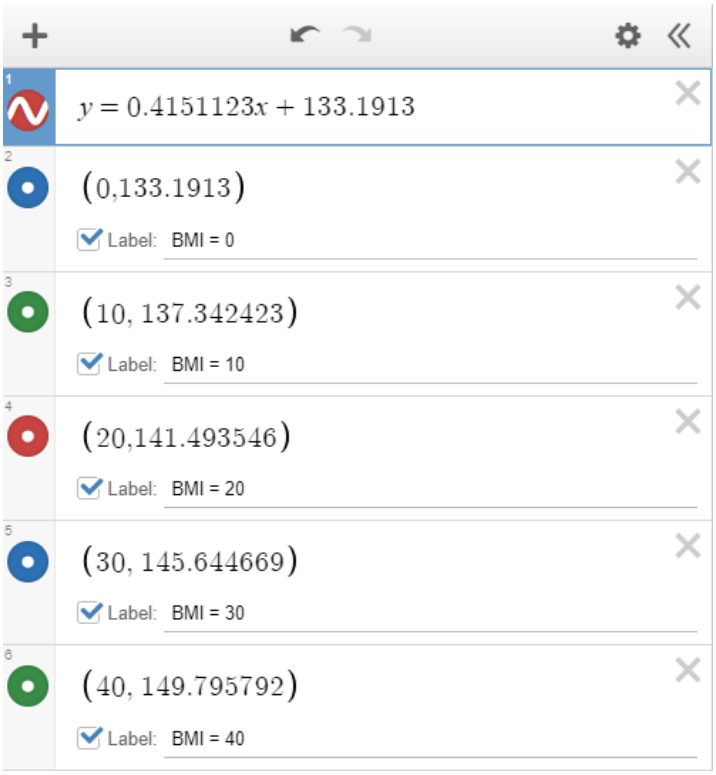
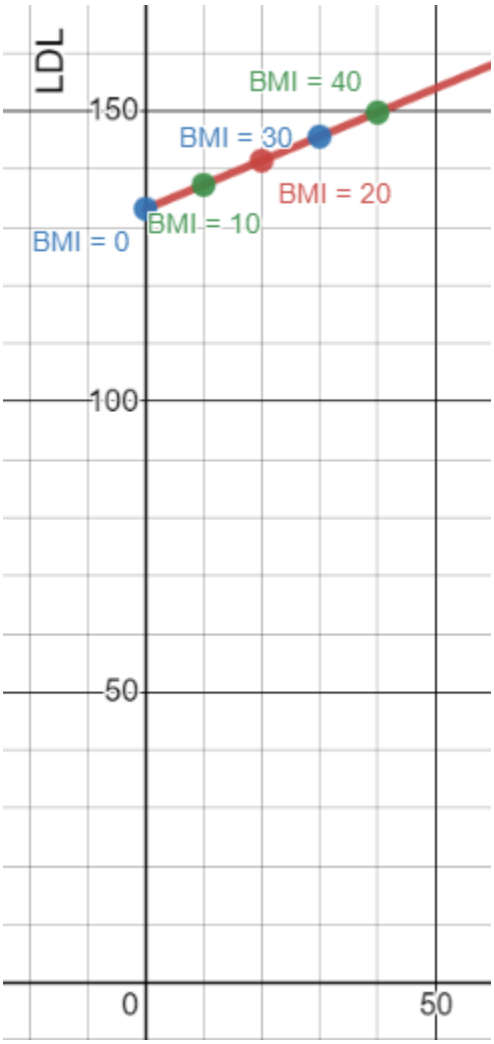
PUB490Z Final

I, Aaron Tsui, certify that this exam reflects my own work and that I did not receive help from anyone in completing this work.

/s/ Aaron Tsui, 12/15/2021

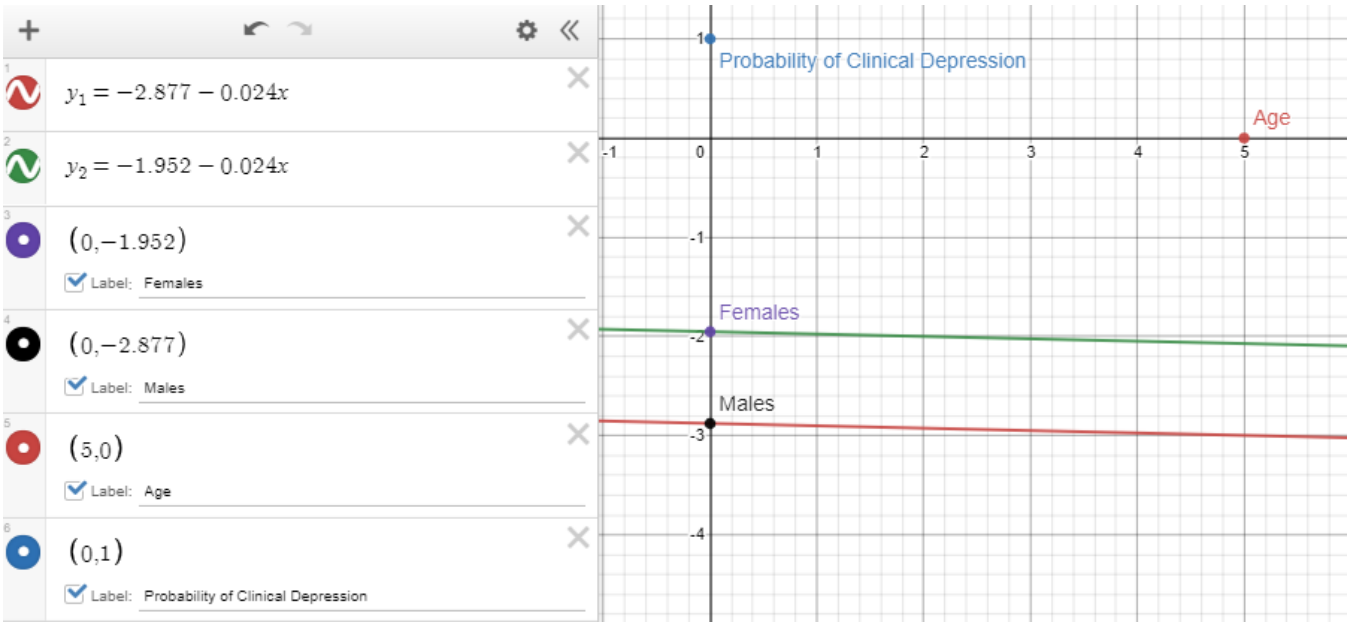
1. Q1
    a. 0.4151123
    b. [125.7521, 140.6305]
    c. 0.3591038
    d. [129.165, 165.4656]
    e. We assume linearity, independence, normally distributed residuals, and constant variance of residuals at every point.





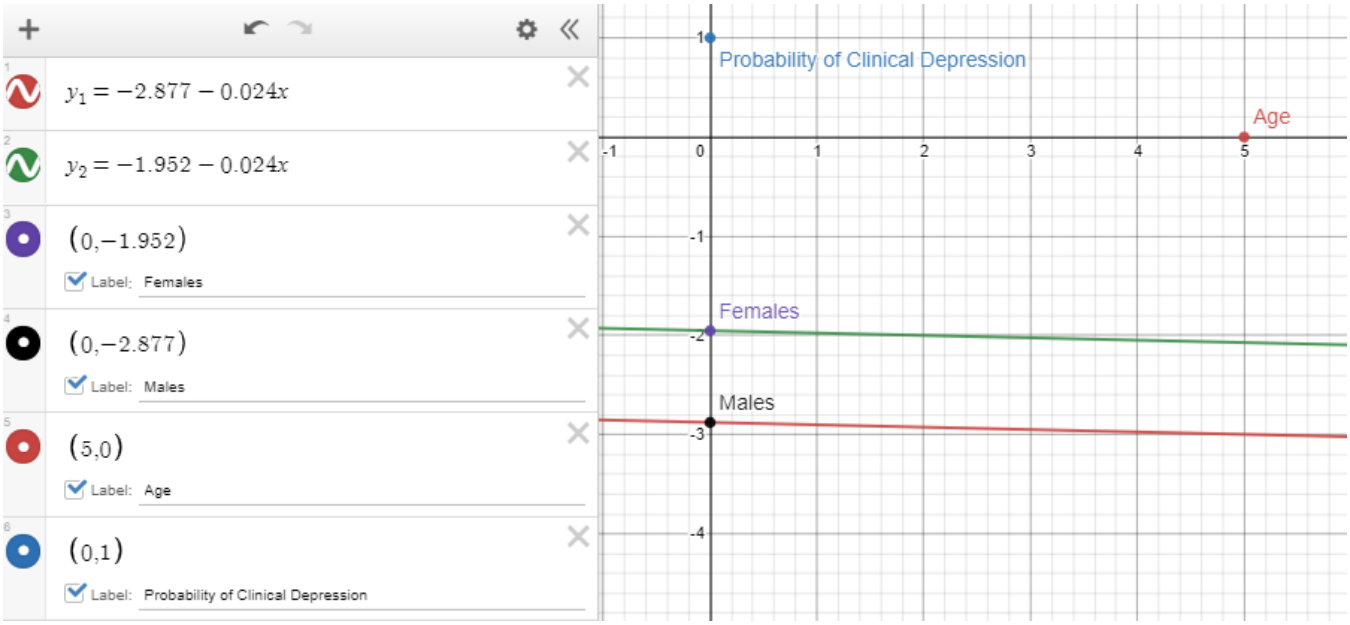
2. Q2
    a. 0.925 ± 2(0.393) = [0.139, 1.711]
    b. Calculations
        i. Female Age 60 Income 50,000 = 0.925(1) - 60(0.024) - 50(0.040) - 0.477 = -2.992
        ii. Male Age 45 Income 75,000 = 0.925(0) - 45(0.024) - 75(0.040) - 0.477 = -4.557
        iii. Estimated odds ratio = -2.992/-4.557 = 0.6566
    c. Female Age 60 Income 35,000 = 0.925(1) - 60(0.024) - 35(0.040) - 0.477 = -2.392
    d. Q2d, X is age of subject
        i. Probability of Clinical Depression for males with income fixed at $60,000
        = 0.925(0) - 0.024(X) - 60(0.040) - 0.477
        = -2.877 - 0.024X

        Since probability cannot be negative and the slope of the line is also negative, the probability of clinical depression for males with income fixed at $60,000 can be treated as zero.



ii. Probability of Clinical Depression for females with income fixed at $60,000
= 0.925(1) - 0.024(X) - 60(0.040) - 0.477
= -1.952 - 0.024X

Since probability cannot be negative and the slope of the line is also negative, the probability of clinical depression for males with income fixed at $60,000 can be treated as zero.



e. We might expand the model by adding another variable like average living standard cost in each area, which would put the Income variable into better context. $60,000 per year income may be high in a poorer area but not so much in a richer area. We could also add hours worked per week, which would enhance the validity of our model.

Probability of Clinical Depression = 0.925(Sex) - 0.024(Age) - 0.040(Income) - 0.477 + coeff(Avg. Living Standard Cost) + coeff(Hours Worked per week)