

Place your name on the back of this sheet of paper and nowhere else. Staple your answers face up on the front of this sheet of paper. Failure to follow these directions will cost you 10 points. Your assignment will be typed, except graphs can be drawn by hand and mathematical equations can be done by hand. Failure to type it will cost you 10 points. If you use double-sided printing or print on the back of scrap paper, I will give you one additional point.

1) (15 points) Explain  $\Delta Y/Y = 3 - 2\Delta u$ . You can treat  $\Delta Y/Y$  as one variable if you define it. Explain why the 3 is not 0 and why the -2 is not -1.

2) (15 points) If you go to <https://data.bls.gov/timeseries/LNS14000000> and change the time frame to just be this year, you will see that at no point did the unemployment rate go up this year. Half of the months it was stable and half it dropped. However, if you go to <https://www.bea.gov/data/gdp/gross-domestic-product> and look at that data, you will see that in both the first and second quarters of the year, the GDP dropped. Explain how those two facts contradict the equation in Question #1. What is happening to cause this? Hint: think about what could be causing the unemployment rate to go down, but cause GDP to go down too. Think more about the second quarter. The first quarter has some bizarre stuff happening, so do not worry about the first quarter.

3) (45 points) Draw the real labor supply/labor demand diagram, the production function with capital on the horizontal axis, and the production function with labor on the horizontal axis. Illustrate the effects of an improvement in technology. Explain why the curves moved as drawn. What happens to the real wage, level of output, and level of employment? Make sure you show the before and after points on the two graphs.

4) (10 points) Given the way we draw the labor supply curve, are we assuming the income effect or the substitution effect is greater? Explain your logic.

5) (15 points) Discouraged workers have interesting effects upon the unemployment rate. When a person becomes a discouraged worker, what happens to the unemployment rate? Why? Which type of unemployment changed? Why did you choose that type?