

final exam.

Part A. Explain the following in your own words using language that would make sense to someone who has not studied economics or mathematics.

- 1) What are transitive preferences and why do economists often assume that the consumers in their models have transitive preferences?
- 2) What is a utility function?
- 3) What is an equilibrium price in a market?

Part B. Answer These.

hats.

A firm produces hats h using labor x_1 and robots x_2 . The cost of labor is w_1 and the cost of robots is w_2 . The production function is $h = x_1^{\frac{1}{3}} x_2^{\frac{1}{3}}$.

- A) Does the firm have *increasing, decreasing* or *constant* returns to scale?
- B) Show that, if the firm is minimizing costs, it will always spend the same amount of money on labor and robots $x_1 w_1 = x_2 w_2$.
For the rest of the problem, assume the input prices are $w_1 = 1$ and $w_2 = 1$.
- C) What are the conditional factor demands for labor and robots?
- D) Show that, at these input prices, it costs the firm $c(h) = 2h^{\frac{3}{2}}$ to produce h units of output.
- E) What would it cost for the firm to produce h units of output in the short run if it was stuck using one robot $\bar{x}_2 = 1$.
- F) Find the short-run marginal cost of the firm.
- G) If the price of output (hats) was $p = 300$ how much would the firm produce **in the short run** to maximize profits?

more hats.

Suppose demand for hats is given by $h = 81 - p$ and the supply of hats is $q_s = 8p$.

- A)** What is the equilibrium price and quantity of hats?
- B)** What is the elasticity of demand for hats at the equilibrium price? Is the demand elastic, inelastic, or unit elastic?
- C)** Suppose the government imposes a 9 dollar quantity tax on hats. What is the new equilibrium quantity?
- D)** Including the tax, how much more do consumers pay for hats under this tax than they did with no tax? How much less do producers receive?
- E)** Why do you think producers are able “pass on” most of the tax to consumers in this model?
- F)** What is the dead-weight-loss associated with this tax.

work rap nap.

G. is preparing for a presentation. He has t hours until the presentation. He can work on slides (s), or listen to “boasty” Kanye West music (r). G’s goal is to maximize the quality of his presentation, which is measured in applause time (a). The quality of his presentation is given by $a = (2s)^{\frac{1}{3}} (2r)^{\frac{1}{3}}$ where a is the seconds of applause he will receive.

- A)** Characterize how G. should spend his time given any amount of time t .
- B)** Write down the amount of applause G. can achieve given t hours of time.
Now suppose G. can take a one-hour nap. It will boost his energy. If he takes a nap, his applause time will be given by $a = (2s)^{\frac{2}{3}} (2r)^{\frac{2}{3}}$.
- C)** Write down the amount of applause G. can achieve given t hours of time if he takes a nap- remember that the nap costs one hour of this time.
- D)** If G. has 4 hours of time available until the presentation, how should he spend his time? What if he only has 2 hours available? (You may need a calculator for this.)