Name: _____ ELP 390G Denning

Problem Set 10 – Incidence

*Estimated time: about an hour. Type your responses and submit a single PDF *ON CANVAS*. Show your work on anything you compute. Label all axes and key points on graphs. A photo of a hand-drawn sketch is fine.*

Part 1: Statutory and Economic Incidence

1. Five students are deciding whether to enroll for a year. Their marginal willingness to pay is:

Student	MWTP
A	\$12,000
B	\$10,000
C	\$8,000
D	\$5,000
E	\$2,000

   Tuition is \$8,000.

   (a) Graph these as a bar chart ordered from highest to lowest MWTP, and mark tuition. How many students enroll?

   (b) The federal government introduces a \$3,000 grant for every enrolled student, and the college leaves tuition at \$8,000. How many enroll now? Show the grant on your bar chart. Did demand shift vertically or horizontally, and by how much?

   (c) Who is the marginal student? Of the total the government spends on grants, how much goes to students who would have enrolled without one?

   (d) Now suppose the college responds to the grant by raising tuition to \$10,000. How many students enroll? What is the net price a student pays, and how does it compare with the \$8,000 she paid before the program existed?

   (e) Using (d), divide the \$3,000 between the student and the college. Who bears the *statutory* incidence of this grant, and who bears the *economic* incidence? Answer in two sentences.

2. For each policy below, state (i) which curve shifts, (ii) in which direction, and (iii) whether it is a vertical shift by a dollar amount or a horizontal shift by a quantity. One sentence each.

   (a) A \$2,000 grant paid to every enrolled student.

   (b) A \$2,000 subsidy paid to the college for every student it enrolls.

(c) A \$500 per-student tax levied on colleges.

(d) A recession that leaves 4,000 more students wanting a seat at every tuition level.

(e) The legislature funds 5,000 additional seats.

Part 2: Computing Incidence

3. A state's market for college seats, with P in thousands of dollars and Q in thousands of students:

$$Q_D = 48 - 3P \qquad Q_S = 2P + 8$$

(a) Find the tuition and enrollment before any aid. Show your work and check your answer in both equations.

(b) The federal government introduces a \$5,000 grant paid to every enrolled student. Write the new demand equation and find the new equilibrium.

(c) Report three numbers: the sticker tuition, what the student pays out of pocket, and what the college receives per student. Divide the \$5,000 between the student and the college.

(d) The slopes are 2 on the supply side and 3 on the demand side. Graph both curves with price on the vertical axis: which is steeper? Use that to predict whether the student or the college keeps more than half of the grant. Does it match (c)? Explain in one sentence why the split came out the way it did.

(e) Start again from the original equations, but now pay the \$5,000 to colleges for each student enrolled rather than to students. Write the new supply equation and solve. Compare enrollment, what the student pays, and what the college receives with your answers in (c).

(f) What does the program cost in total? Enrollment rose — so what is the cost per *additional* student enrolled? Why is that figure so much larger than \$5,000?

4. Keep demand at $Q_D = 48 - 3P$ and the \$5,000 student grant from Problem 3, but change the supply side.

(a) The college has 24,000 seats and cannot add any. Find the new tuition, the net price a student pays, and enrollment. How much of the \$5,000 does the college capture?

(b) Instead, the college will supply as many seats as students want at a tuition of \$8,000. Find the net price and enrollment. How much does the college

capture now?

(c) Describe the kind of institution that fits each case. Which one is a selective flagship, and which is an open-admission online program?

(d) A college in case (a) points out that it has not raised its sticker price at all. Name two other ways it could still be capturing the grant, and name the one statistic you would ask for to settle the question.

Part 3: Beyond Financial Aid

5. A state offers \$8,000 a year in loan forgiveness to teachers who work in rural districts. In one such district the teacher market is $Q_D = 80 - w$ and $Q_S = 3w - 120$, with w in thousands of dollars and Q in teachers.

   (a) Find the salary and the number of teachers before the program.

   (b) The forgiveness is paid to teachers. Which curve shifts, and in which direction? Explain in one sentence why it moves that way, then write the new equation and solve.

   (c) What happens to the salary the district pays, and to the number of teachers employed?

   (d) A teacher's total compensation is salary plus forgiveness. By how much did it rise? Who received the remainder of the \$8,000, and through what mechanism?

   (e) The district is locked into a statewide salary schedule and cannot lower what it pays. Redo (c) and (d) under that constraint. Who captures the forgiveness now, and what happens to the number of people applying per opening?

   (f) Based on (d) and (e), does a rigid salary schedule make this program more or less effective at raising teacher pay? Does it make it more or less effective at filling classrooms? Two sentences.

6. True or False, and explain in one or two sentences.

   (a) "The grant is paid to students rather than to colleges, so colleges cannot benefit from it."

   (b) "The college did not raise its published tuition after the grant, so students kept the entire grant."

   (c) "Because the state pays the subsidy straight to institutions, it is a policy that helps colleges rather than students."

(d) "A new scholarship at a college that turns away five of every six applicants will raise the number of students who attend it."

(e) "Loan forgiveness worth $8,000 raises a teacher's pay by $8,000."