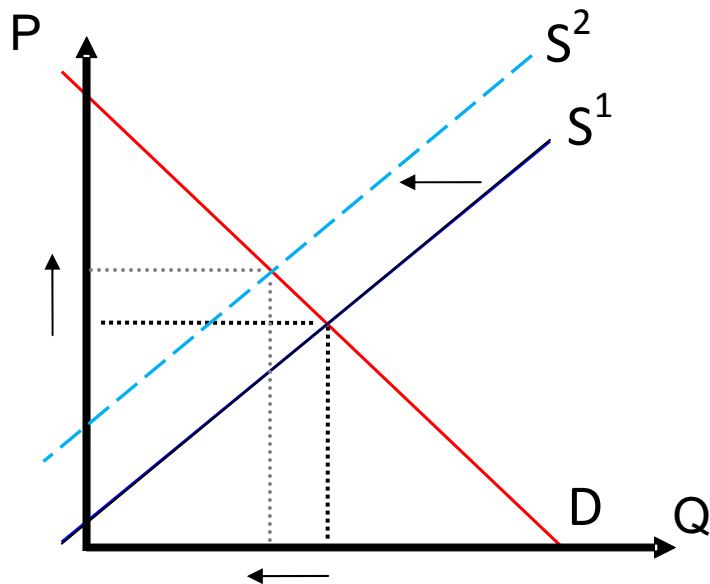
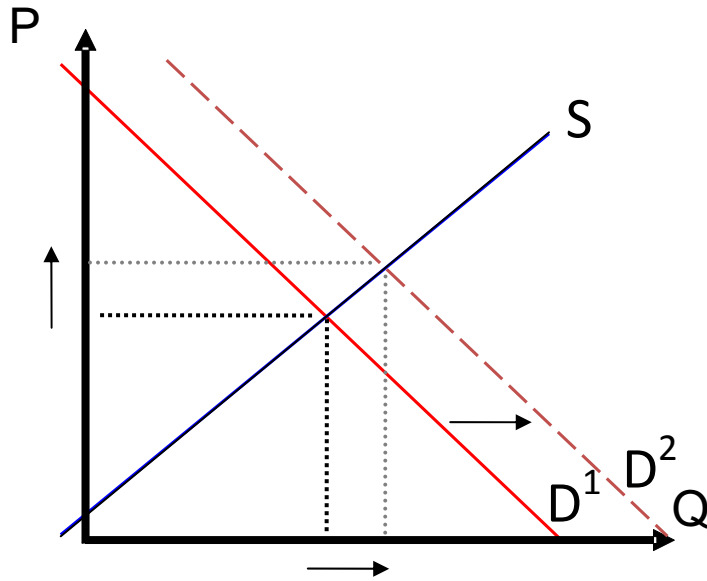


This is the solution guide compiled by your instructors of Econ 1101. This is a guide for form A. If you had form B, you can still figure from this guide what the answers to your questions are. If you have any questions, please contact your TAs or instructors.

2. The amount of corn that a given acre of farmland can produce depends on the amount of rainfall, so we can think of a draught as a decrease in corn farmers' productivity. This falls into the "technology" category of supply shifters we talked about during week 2. The supply curve shifts to the left from S^1 to S^2 , while the demand curve remains fixed, and we can see from the graph below that the equilibrium quantity falls while the equilibrium price rises. The answer is B.

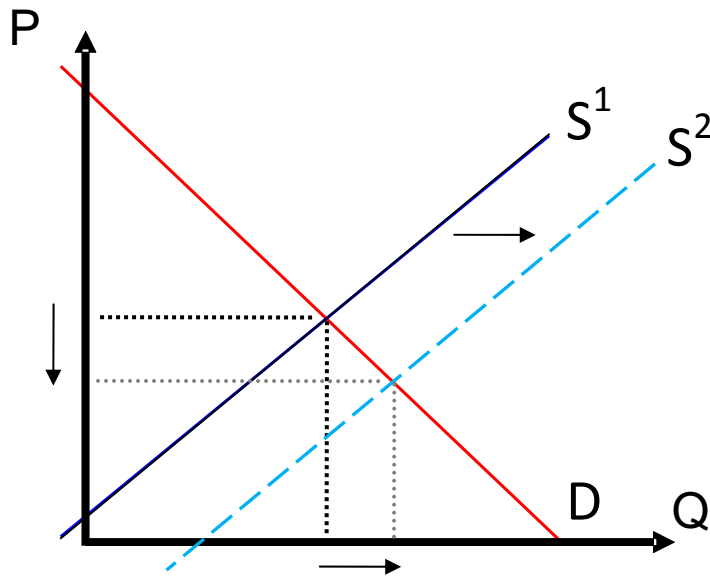


3. Ethanol-powered cars and ethanol fuel are complements. Since ethanol is made out of corn, this means that ethanol-powered cars and corn are complements. A decrease in the price of a complementary good shifts demand for the original good outward, so a decrease in the price of ethanol-powered cars causes the demand curve for corn to shift out from D^1 to D^2 while the supply curve remains fixed. We can see from the graph below that the equilibrium price and quantity both rise. The answer is A.

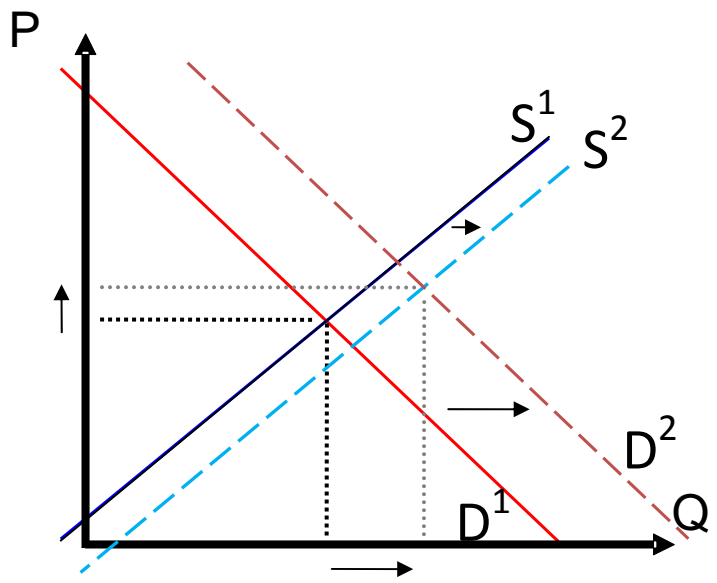
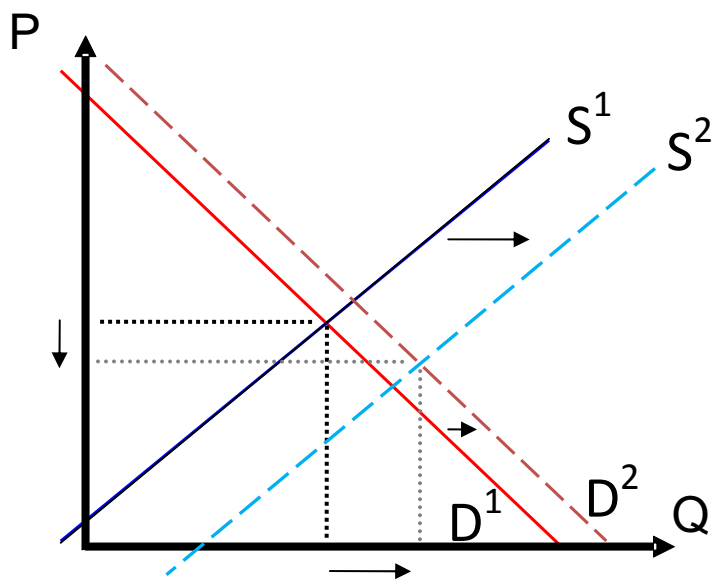


4. Sugar is a substitute for corn syrup since they're both sweeteners. Since corn syrup is obviously made of corn, sugar is also a substitute for corn. An increase in the price of a substitute causes demand for the original good to shift outward, so an increase in the price of sugar causes the demand curve for corn to shift outward from D^1 to D^2 while supply remains fixed. The graph for question 3 applies to this question as well. The answer is A.

5. The development of an insect-resistant strain of corn will increase the amount of corn that a given acre of farmland can produce since less of the corn that is planted gets destroyed by bugs. We can think of this as an improvement in corn farmers' technology, which causes the supply curve to shift outward from S^1 to S^2 , while demand remains fixed (basically the opposite of question 2). From the graph below, we can see that the equilibrium price falls while the equilibrium quantity rises. The answer is C.



6. This question combines the scenarios in questions 4 and 5, so we know that both the demand and supply curves shift outward. In both questions 4 and 5 the equilibrium quantity rose, so we know that regardless of which curve shifts more the equilibrium quantity will rise. However, in question 4 (just demand shifts) the equilibrium price rose, while in question 4 (just supply shifts) the equilibrium price fell. This means that we can't determine which direction the price will move when we combine the two scenarios. To see this, consider the two graphs below. In the first graph, the demand curve shift is small relative to the supply curve shift, and we can see that the equilibrium price falls. In the second graph, the demand curve shift is large relative to the supply curve shift and the equilibrium price rises. So we can see that the direction of the equilibrium price movement depends on which effect dominates. The answer is A.

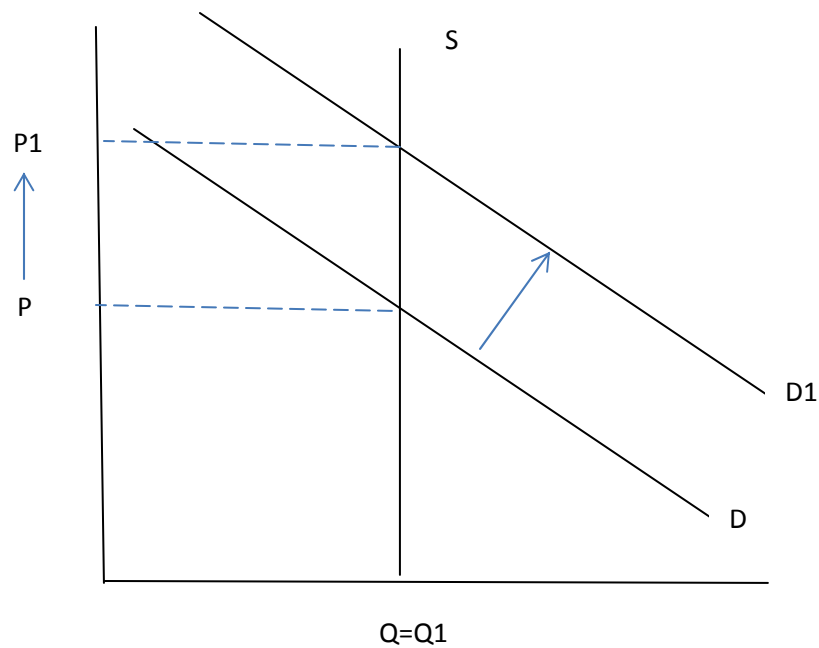


7. The first thing we want to do as the ISO is to arrange the bids from the buyer from the highest to lowest, and the bids from the sellers from the lowest to the highest. We want to do this because we want the most efficient sellers to sell first and the consumers who want the good the most to consume first. We get the following table:

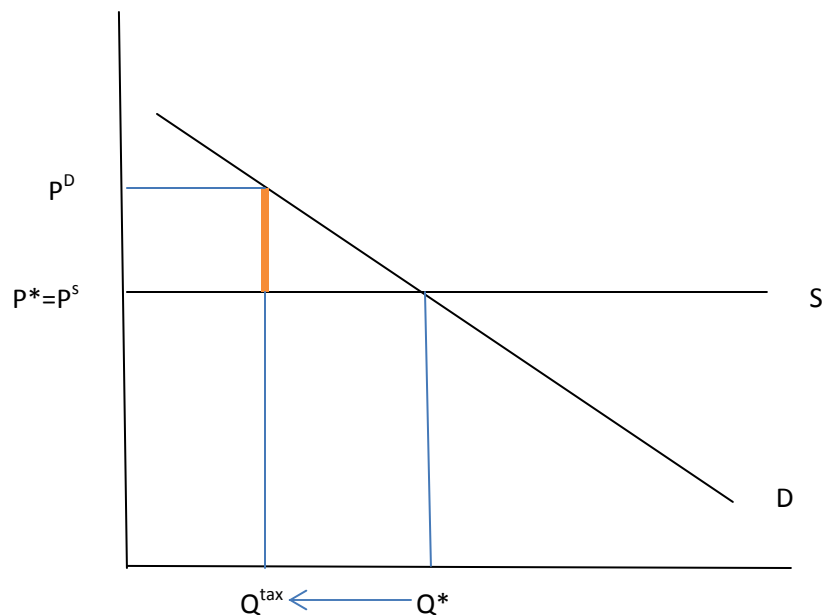
Buyers	Bid (Offer to buy in \$)	Sellers	Bid (Offer to sell in \$)
Charles	14	Allie	3
Dane	12	David	4
Bill	8	Earl	4
Elizabeth	5	Cindy	5
Aretha	3	Brett	14

We see then that the price that clears the market, or the price that causes the demand and supply to be equal, is \$5. This is because at \$5, Charles, Dane, Bill, and Elizabeth are willing to purchase one unit of electricity (so the demand is 4), and at \$5, Allie, David, Earl, and Cindy are willing to sell one unit of electricity (so the supply is also 4). The answer is C.

8. Here, we just need to look at each answer and see whether or not the people are buying or selling in the market clearing allocation of 4 units, at a price of \$5. Going down the list, we see that Aretha does not consume, so A is not correct. Charles does buy, but Brett does not sell. So B is incorrect as well. Looking at C, Bill does buy, and David does sell. So the answer is C.
9. First, realize that a change in consumer income is a demand shifter. Which way it shifts depends on the type of good that we are looking at. We are not given whether a widget is a normal good or inferior good, so we don't know right away. But we are then given that the price of widgets increase while quantity of widgets remains unchanged. This tells us that the demand shift is a rightward shift, and that widgets are indeed a normal good. How do we know that? Well, if demand shifts to the left instead (i.e. widgets being an inferior good), it must be true that price goes down (unless the supply curve is perfectly elastic, but in this case, we are given that price goes up so we know supply cannot be perfectly elastic). This also tells us that the supply curve is perfectly inelastic, because that's the only way that quantity won't change. See the diagram on the next page. So, the answer is E.



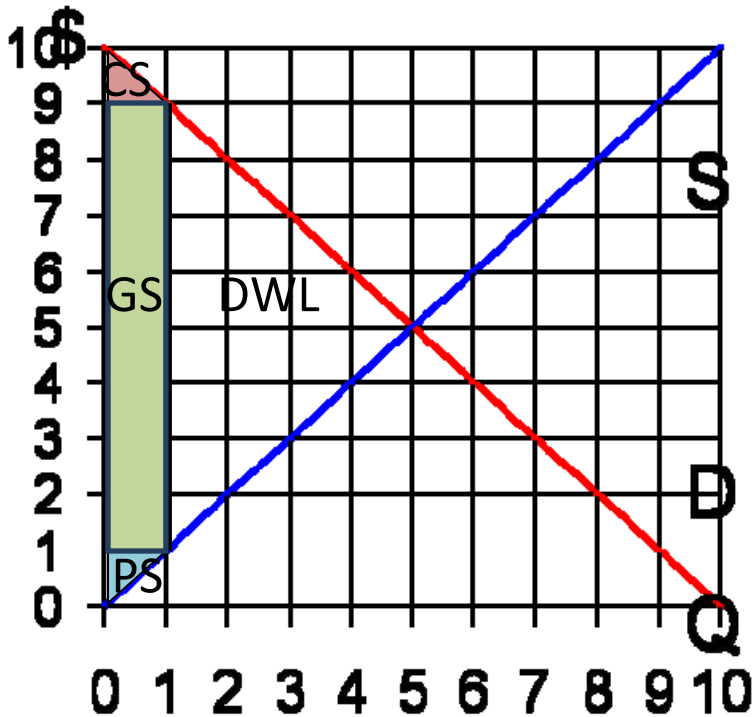
10. The first thing would be to draw the market that we have in the question. We want to draw demand “normally” like how we do since it is unit elastic, and then we want to draw supply as a horizontal line since it is perfectly elastic. With cases like this, it always helps to just draw a normal supply and demand diagram and see how the tax wedge is drawn. If you do that, you will realize that we want to draw a wedge from the demand curve DOWN to the supply curve. So let’s see how we can do that here:



So we see that in this industry, a tax will only cause the price that consumers have to pay to go up, which makes sense since supply is perfectly elastic – which means that it is completely sensitive to price changes. If the price increases by even just a bit, they will not produce. So, the consumers bear the entire burden of tax and equilibrium quantity decreases because of the tax. The answer is A.

11. This is a violation of "efficient production", i.e. the rule that the most efficient (i.e. least costly) producers should produce. If five widgets are to be produced, the five most efficient producers are S1-S5, not S2-S6. Thus, S1 should produce instead of S6. Any deal between S1 and S6 such that S1 willingly produce a widget and S6 willingly give up the production of a widget is a Pareto improvement. The answer is E.
12. A price floor of \$7 gives a quantity demanded (Q_d) of 3 units and quantity supplied (Q_s) of 7 units. Among the buyers, only D1-D3 are willing to pay a widget for \$7 (or above), thus we are certain that they are the buyers. Hence option (1) is certainly true. However, among the producers, S1-S7 are willing to produce and sell a widget at \$7. Since only three widgets will be transacted (because there are only three buyers), the production of three widgets among seven willing producers will have to be rationed. No such rationing rule is mentioned in the question, thus option (5) is true, instead of option (3) or (4). The answer is D.

Variable	Free Market	\$8 Tax	Change
Q	5	1	-4
p^D	5	9	+4
p^S	5	1	-4
CS	12.5	0.5	-12
PS	12.5	0.5	-12
Gov't Surplus	0	8	+8
TS	25	9	-16



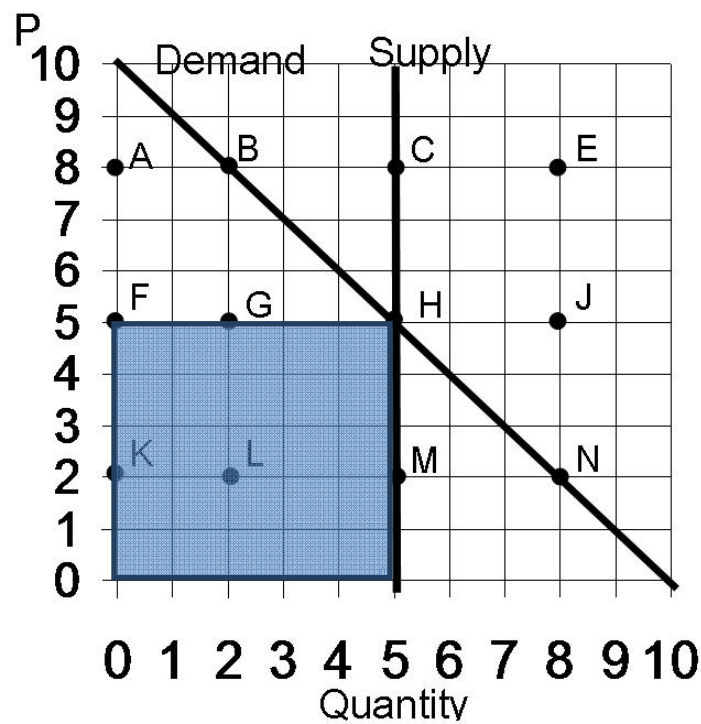
13. A wedge of height \$8 is placed on the left of the free-market equilibrium, between the demand and supply curves, at $Q=1$. The price paid by the consumer (P_d) is where this wedge meets the demand curve, i.e. at \$9. The answer is D.
14. The equilibrium quantity under a \$8 tax is the quantity where the wedge is placed, i.e. $Q=1$. The answer is E.
15. The producer surplus is always defined as the area between the supply curve and the price received by suppliers, across all quantities transacted. The price received by suppliers is found where the supply curve meets the wedge, i.e. at \$1. The area of producer surplus is thus the triangle bounded by the supply curve, the horizontal line at $P=\$1$, and runs across quantity up to $Q=1$. Thus the area is $1 \cdot 1 \cdot 0.5 = 0.5$. The answer is A.
16. Consumer surplus before tax is given as 12.5. Let's first calculate the consumer surplus after tax. Consumer surplus is always defined as the area between the demand curve and the price paid by consumers, across all quantities transacted. The price paid by consumers is \$9, as explained in Question 13. Quantity transacted is $Q=1$. Thus after-tax consumer surplus is the area of the triangle, $1 \cdot 1 \cdot 0.5 = 0.5$. Thus, change in consumer surplus is $0.5 - 12.5 = -12$. The answer is D.
17. The change in total surplus is given by the area of the dead weight loss (DWL), which is the triangle

bounded by the demand curve, the supply curve, and the lost quantity transacted (i.e. from $Q=1$ to $Q=5$). (The intuition is that DWL comes from these unrealized transactions which were mutually beneficial otherwise.) The area of this triangle is $8 \cdot 4 \cdot 0.5 = 16$. This is a loss in surplus, thus the change in total surplus is -16 . This can also be found by summing the change in $(CS+PS+GS)$, as in table above. The answer is E.

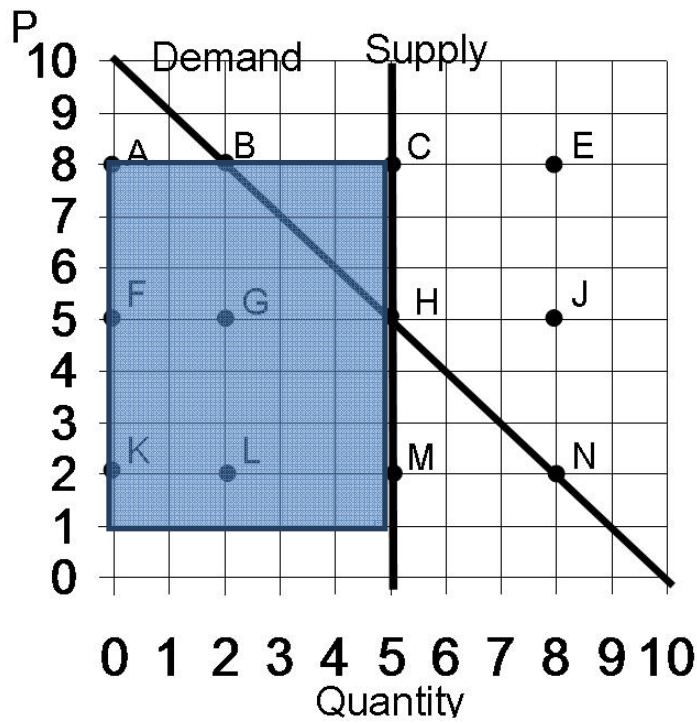
18. Only rule 3) is violated. Tax puts wedge between price for marginal consumers (MRP) and price for marginal producers (MC), thus they are not equalized with taxes. However, allocations for consumption and production are still efficient, therefore, still the consumers with highest values get to buy and most efficient producers get to produce, so both 1) and 2) are satisfied. The answer is D.
19. At $Q=4$ units of widget, the difference between marginal price for consumer ($\$6$) and marginal cost of producer ($\$4$) is $\$2$, thus the price for quotas, which will make the marginal producer indifferent to produce or not. The answer is B.
20. If quotas are given to producers for free at the beginning, and traded for $\$2$ as Q19 suggests, the profits from trading the 4 quotas will be $\$2 \cdot 4 = \8 , and the surplus from making the widget is still the triangle area framed by $\$4$ price line faced by producers, supply curve and y axis, which is $0.5 \cdot \$4 \cdot 4 = \8 , thus the total surplus is $\$16$. The answer is A.
21. Just compare the total surplus for producers using the methods in Q20. If $Q=0$, the surplus is 0 since no one buys or sells. If $Q=1$, quota price will be $\$8$, and producer's total surplus being $\$8 \cdot 1 + 0.5 \cdot \$1 \cdot 1 = \$8.5$. If $Q=3$, quota price will be $\$7 - 3 = \4 , and total surplus for producers being $\$4 \cdot 3 + 0.5 \cdot 3 \cdot \$3 = \$16.5$. If $Q=4$, it is $\$16$ from Q20. If $Q=6$, quota price will be 0, and nobody is going to trade any quotas, free market back at work, $PS = 0.5 \cdot \$5 \cdot 5 = \12.5 . So the highest is $Q=3$. The answer is C.
22. This question is simply asking for the assumptions necessary for the First Welfare Theorem to hold. (1) is not necessary – the First Welfare Theorem talks about the size of the social pie and has nothing to say about the equitable distribution of the social pie. (2) is necessary because we must assume firms take the market price as given and are not capable of influencing the market price. We'll discuss situations where perfect competition doesn't hold later in the semester. (3) is not necessary. Perfect elasticity is a possibility for the supply curve in some markets, but any supply curve will work with the First Welfare Theorem. (4) is necessary because externalities drive a wedge between the social cost (or benefit) of the good and the private cost (or benefit) of the good. If externalities are present, the First Welfare Theorem fails because the unregulated market cannot take into account the wedge of the externality and therefore produces a socially inefficient quantity. The answer is B.

23. This supply curve is vertical. This means there is a limited quantity of goods available, no matter how much consumers are willing to pay for them. A good example of this sort of supply curve is the market for Picasso originals. Since a change in price leads to no change in quantity, this is a perfectly inelastic supply curve. The answer is D.

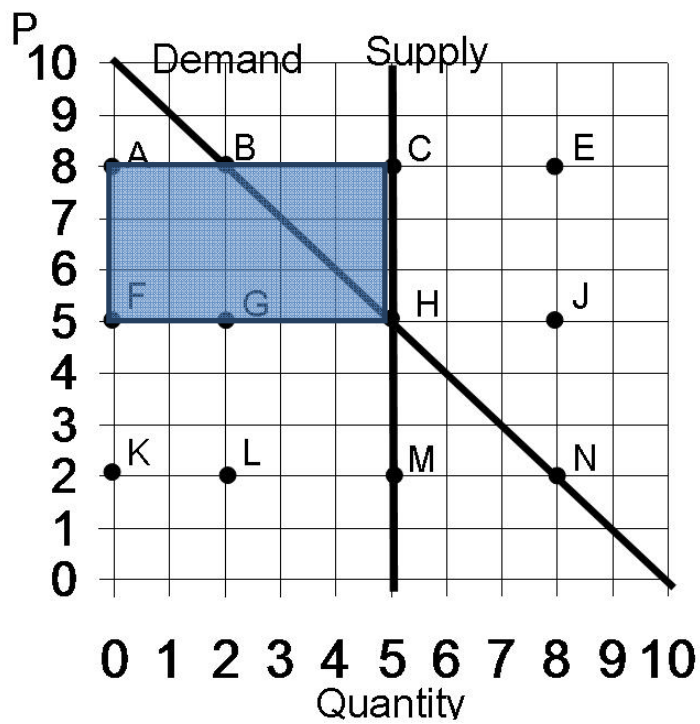
24. The easiest way to calculate this is to figure out the producer surplus before and after the change. Before the subsidy, the intersection of supply and demand gives us the market equilibrium. This means the quantity is 5 and the price is 5. The producer surplus is the area between the supply curve and the price line, and is shown on the graph below in blue:



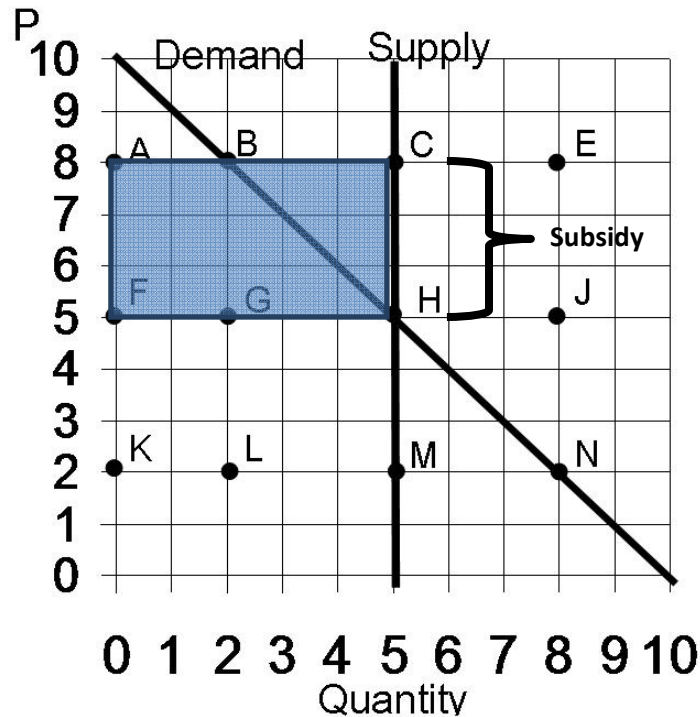
With a \$3 subsidy, we must find a place where the price producers receive, P^S , is \$3 greater than the price the consumers pay, P^D . Since supply is perfectly elastic, the only quantity we should look at is $Q = 5$. Therefore, under the subsidy, $P^S = \$8$, $P^D = 5$, and $Q = 5$. The producer surplus in this instance looks like this:



Subtracting the first area from the section, we get the change in producer surplus, ACFH. The answer is A.



25. The cost of the government subsidy is equal to the amount of the subsidy, \$3, times the quantity of goods subsidized, 5. That area is represented on the graph below in blue, ACHF. The answer is D.



26. To answer this question we need to calculate the elasticity of demand. Note that we are given a change in price and a corresponding change in demand so price elasticity of demand can be calculated. The formula for this is $-(\% \text{ change in quantity})/(\% \text{ change in price})$. $(\% \text{ change in } Q) = (q_2 - q_1)/.5(q_1 + q_2) = (5 - 3)/.5(3 + 5) = 2/4$. $(\% \text{ change in } P) = (p_2 - p_1)/.5(p_1 + p_2) = (9 - 11)/.5(11 + 9) = -2/10$. So Elasticity of demand = $-(\% \text{ change in quantity})/(\% \text{ change in price}) = -(2/4)/(-2/10) = 2.5$. We call elasticities that are greater than 1 elastic, so A is the correct answer. If the elasticity was less than 1 we would call it inelastic and if it was equal to 1 we would call it unit elastic. To measure income elasticity we would need to know how quantity demanded responded to changes in income --- since we are given no information about income here we can't say anything about answers D or E. The answer is A.

27. Recall that the formula for elasticity of demand is $-(\% \text{ change in quantity})/(\% \text{ change in price})$. The last row of the table gives % changes. Reading from the table we can see that %change in Q is $-.05$ and % change in P is $.28$. Therefore Elasticity of demand = $-(\% \text{ change in quantity})/(\% \text{ change in price}) = -(-.05)/(.28) = .05/.28$, and B is the correct answer. We say that this is a short run estimate (as opposed to long run) because, as discussed in lecture, a one year period is too short of a time for consumers to change commuting habits or buy new vehicles --- so this reflects the short run response of quantity of gas demanded to a change in price. The answer is B.

28. The statement in answer A is incorrect because when elasticity of demand is estimated we want the demand curve to be fixed (we want there to be a movement along the demand curve) AND we are told nothing about prices of substitutes. If the demand curve shifted, it wouldn't be fixed and we couldn't estimate elasticity of demand in this way. Answer B is incorrect because we need a movement along a fixed demand curve. Answer C is incorrect because we are able to estimate elasticity regardless of the magnitude of the changes. Answer D is correct, because driving habits fluctuate by season, so it is appropriate to compare June to June, while comparing June to December would not hold driving habits fixed. The answer is D.
29. Statement 1 is correct because the slope of the line is approximately 1 which means that any increase in gas taxes raises gas prices by the amount of the tax --- this means that any gas tax is fully passed on to consumers, and that consumers bear the burden of the tax. Statement 2 is correct because when supply is perfectly elastic that means suppliers will supply any quantity at the given price but will not sell any at a higher price, so if a tax is imposed, the price to suppliers must remain the same and the price consumers pay must go up by the amount of the tax. Therefore the correct answer is C.
30. According to the "Law of demand" higher is the price of a good lower is the quantity demanded. So a higher gas price in Norway indicates a lower demand for gas in Norway as compared to the US. Also public transit is a substitute good for using gasoline to drive a car. So a better public transit system in Norway (cheaper substitute available) shifts the demand curve of gasoline downwards, which further decreasing the quantity demanded of gas in Norway. The answer is E.
31. All the options affect demand for gasoline except d. So a, b and c would affect elasticity demand but since d does not affect demand at all, it would not affect the elasticity of demand either. The answer is D.
32. The Canadian government uses the quota system as a supply management policy of the dairy industry in Canada. Quotas are legal rights to production of a unit of good which are distributed to the producers in order to hold back output so they are very different from subsidies which tend to increase the output. So (1) is false. Also under the quota system P^D is higher than the free market case (or with no government regulation) So (2) is false too. The answer is D.