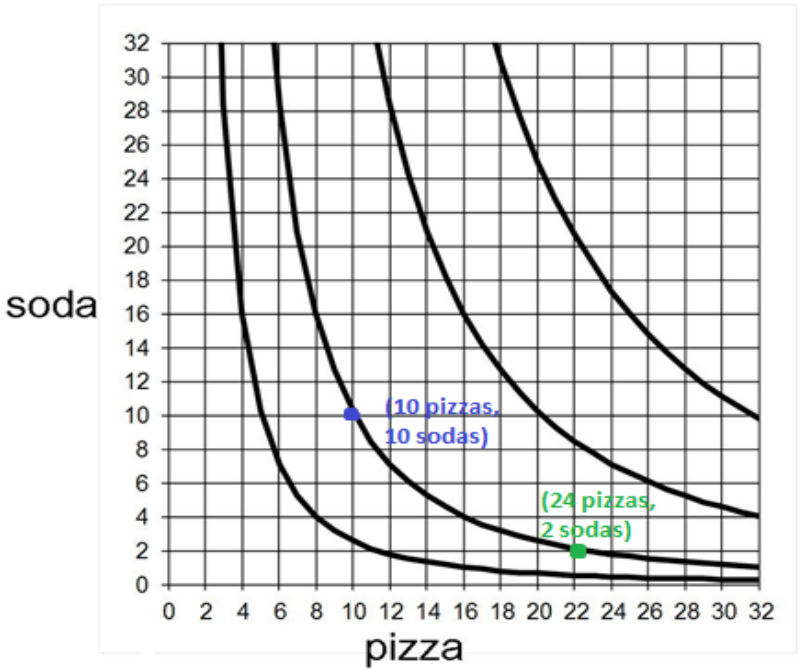
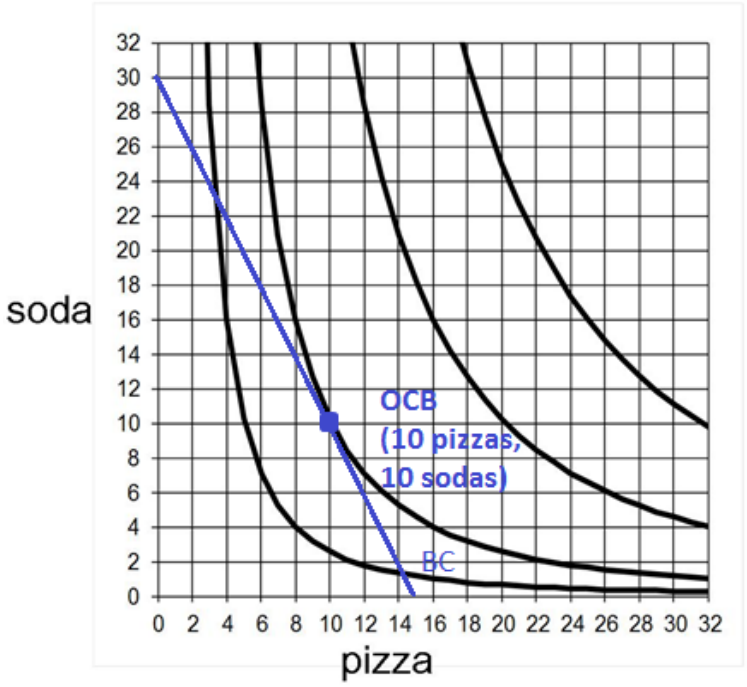
1) This is form A of the exam. **The answer is A.**

2) The point (10 pizzas, 10 sodas) is on the second indifference curve. In order to answer this question we need to find another point that lies on the same indifference curve. The point (24 pizzas, 2 sodas) is the only point from the choices that also lies on this second indifference curve. **The answer is E.**

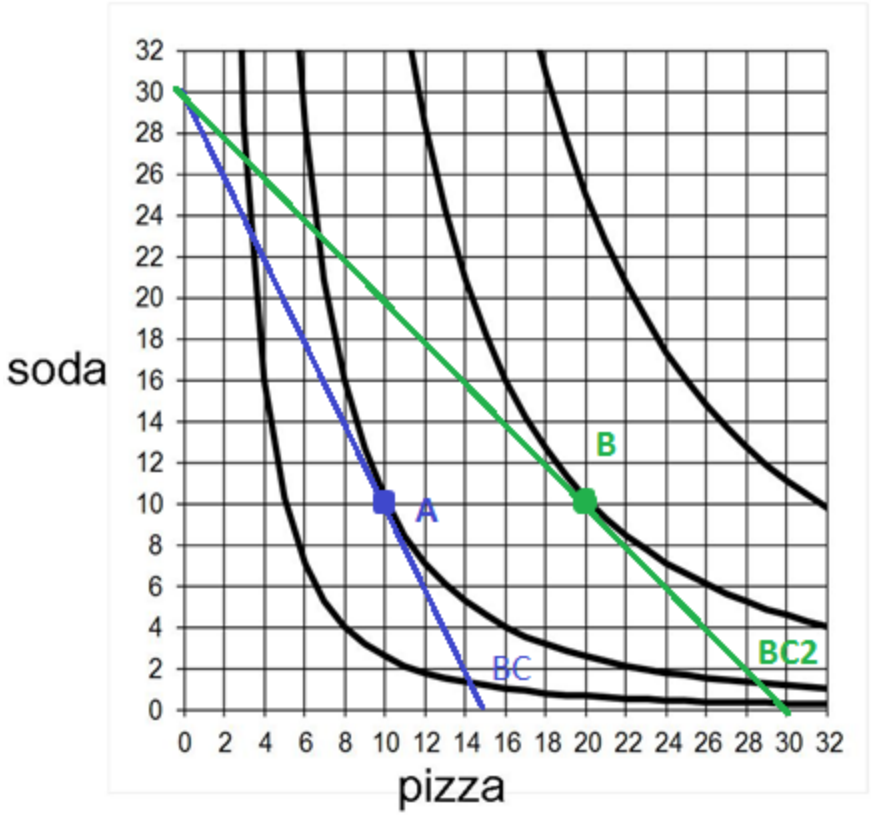


3) Given and income of \$60 the prices P^{Pizza}=\$4 and P^{Soda}=\$2, we can draw the budget constraint. If Terrapin spends all his money on pizza he can afford 15 pizzas. If he spends all his money on soda he can afford 30 sodas. Therefore, (15 pizzas, 0 sodas) and (0 pizzas, 30 sodas) are the extreme points of the budget constraint.. The slope of this line connecting the points (the budget constraint) is -2. Therefore, the opportunity cost of one more slice of pizza is equal to c. **The answer is C**



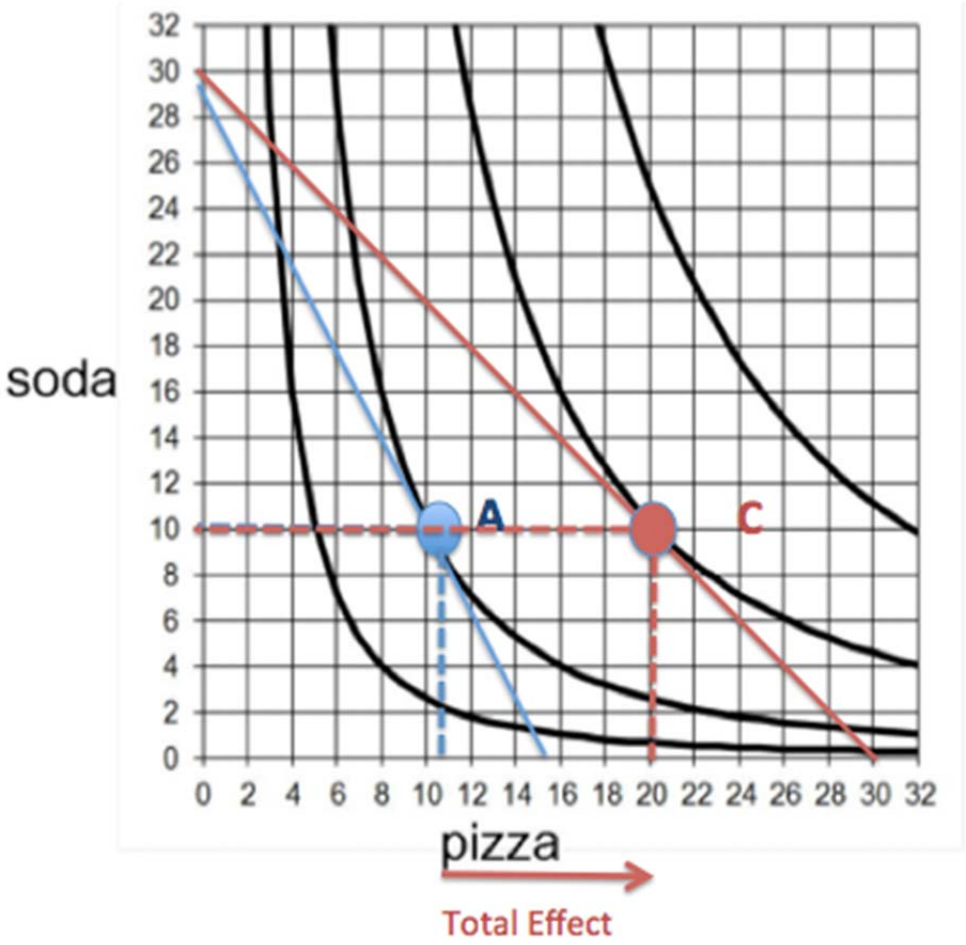
4) Using the budget constraint in the previous question, the optimal consumption bundle is the points on the budget constraint that reaches the highest indifference curve. This point is the points (10 pizzas, 10 sodas). Therefore, (10 pizzas, 10 sodas) is the optimal consumption bundle. **The answer is D.**

5) Because the price of pizza falls to $2, Terrapin can now afford 30 pizzas if he spends all his money on pizza. Therefore, the budget constraint rotates (the budget constraint changes from the blue BC line to the green BC2 line). Using the new budget constraint, BC2, we use the same process as in the previous question we can find the new optimal consumption bundle (point B). Demand moves from point A, (10 pizzas, 10 sodas), to point B (20 pizzas, 10 sodas). Therefore, demand for pizza changes from 10 pizzas to 20 pizzas. **The answer is D.**

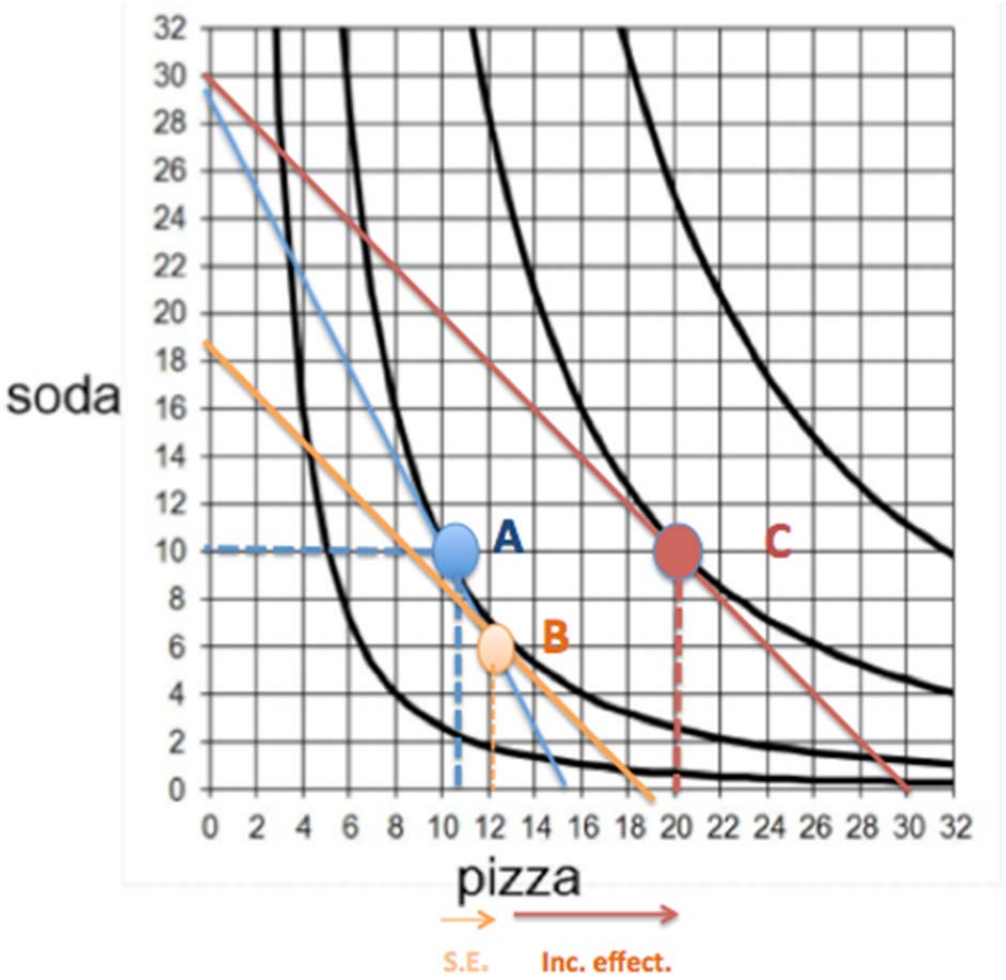


6)

In order to compute Income and Substitution effects we need to proceed in the following fashion. First, compute the initial optimal bundle (point A: (10 pizzas,10 sodas)) and the final bundle (C : (20 pizzas, 10 sodas))when the price for pizza is $2.



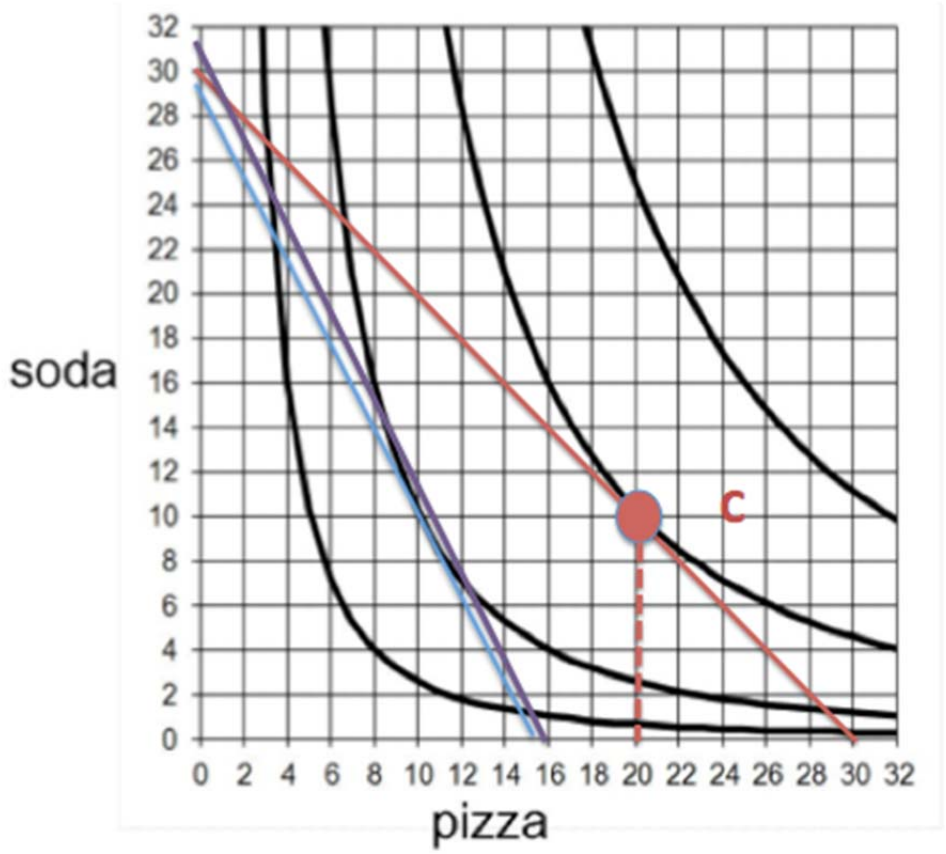
We can see that total effect for pizza is 10 units and for soda 0 units. In order to disentangle income and substitution effects we need an intermediate point B where the initial indifference curve is tangent to a parallel line to the final budget constraint.



The movement from **A to B** (along same indifference curve) is the **substitution effect** and it is positive for pizza (+2) and negative for soda (-4) . The movement **from B to C** (higher indifference curve) is the **income effect**. Income effect is positive for both goods (+8, +4). Hence, relative to pizza, both effects are positive and the income effect (+8) is bigger than substitution effect (+2). The answer is B.

7) Now price for Pizza is $2 and price for soda is also $2. We know that at the new optimal bundle C marginal rate of substitution is tangent to the budget constraint, which slope is just the opportunity cost of pizza in terms of soda. Since now the opportunity cost is just the new ratio of prices (2/2=1), slope is equal to MRS, so it is 1 too. Then, the right answer is C.

8) From question 6) we have seen that if price of pizza goes down to $2, he is going to consume 20 slices of pizza. By increasing the income to $62 we have to analyze the new optimal bundle. We see that the new budget constraint (purple line) would never reach an indifference curve as the point C.



So Terrapin gets more utility by the discount of $2 on the slice of pizza instead of increasing the income to $62. Hence, the answer is A.

9) Let's consider each statement individually:

(i) FALSE. MC is not required to be greater than ATC at all quantity levels. At any quantity where MC>ATC the firm will set P=MC and will be making a profit, and in the LR more firms will enter until there are zero profits in the industry. In an industry LR equilibrium, each firm chooses to produce at its profit-maximizing quantity, which is where ATC is at its minimum. It is also where ATC intersects MC.

(ii) TRUE. This is to ensure that all firms have the same cost curves. (I.e., a firm is more costly when it has worse technology.) This is necessary because all firms will then have the same profit-maximizing price (the minimum ATC), which gives the price of the LR supply curve.

(iii) TRUE. There cannot be barriers to entry because in the LR, the industry's supply adjusts to changing demand by changing the number of firms, not changing the amount of production within each firm.

(iv) FALSE. The supply curve for the individual firm is the MC curve. We don't require it to be unit elastic, it doesn't have an effect on the LR supply curve.

(v) TRUE. This is similar to (ii). This ensures that cost curves of firms do not change as the number of firms in the industry increases.

The answer is D.

10) Recall that TC = FC+VC and dividing through by Q we get that ATC = AFC + AVC. This implies that AFC = ATC –AVC. This is true for any quantity Q. So for Q=3 we see that ATC = 8 and AVC = 5. This implies that AFC = 3 at Q=3. We also have that AFC =FC/Q, so this implies 3=FC/3, and hence we have that FC = 3x3=9. Note that we could have computed FC at another quantity, for example at Q=9. There ATC = 12, AVC =11 and so AFC = 1. Hence FC = AFCxQ = 1x9 =9 as well. The answer is A.

11) The long run P^{LR} is determined by the point where MC intersects ATC. This is because firms in the long run should make zero profits and be profit maximizers hence (P=MC=ATC). This happens when MC and ATC intersect and the price at that intersection is 8, hence P^{LR}=8. The answer is A.

12) q^{LR} is the long run quantity that each firm produces. Here both the zero profit condition and the profit maximization condition should hold hence the firm in the long run produces at the quantity where MC=ATC as in the question above. Hence q^{LR}=3. The answer is B.

13) The equilibrium price in the long run is P^{LR}=8. The demand curve D1 tells us that at that price quantity demanded is 600. The quantity in the industry is the same as quantity demanded. The answer is E.

14) The total industry production is Q^{LR} = 600 and each firm produces q^{LR} = 3. So, it is necessary 200 firms (= 600/3) to produce industry quantity. The answer is D.

15) In the short run the number of firms is fixed and from previous question, we know there are 200 firms. Remember that the short run supply from each firm is its MC curve that is equal for every firm.

Since there are 300 firms, for a given price, we may multiply each firm's production level by the number of firms. The short run industry supply intersects D2 at a price of $4. The answer is A.

16) The optimal condition P = MC(q) implies that at a price of P=$4 (from previous question) each firm will produce q = 1. Profits is defined as Revenue minus costs; that is, Profits = P x q – TC(q) = q x [P – ATC(q)]. At q = 1, Profits = 1 x [4 – 12] = - 8. The answer is C.

17) In the short run, the number of firms is fixed and each firm's production satisfies the optimal condition P = MC(q). This implies a short run upward slopping industry supply. In the long run, the price satisfies the optimal condition P = min ATC(q) and the adjustment in the industry production is given by the number of firms. This implies a long run flat industry supply. A change in demand leads to a change in P, but in the long run it will go back to P = min ATC(q). So, price changes more in the short run than in the long run. As consequence quantity changes less in the short run than in the long run. The answer is D.

18) To find whether something is socially efficient, we can add up the willingness to pay of everyone to see what the societal reservation price would be. If the park would cost more than that, then it would not be an efficient thing to build, though if the cost is under the societal willingness to pay, then it would be a worthwhile investment. We see that the sum of D1, D2, D3, and D4's willingness to pay, so it will be socially efficient to build the park only if the cost is no higher than 11. The answer is D.

19) If widget producers become better off with trade, this must mean that producer surplus is higher after trade is allowed. For this to happen, the country must be exporting the good that the domestic producers are selling (the price that they can sell at will increase, as the other country will buy up any excess supply). Therefore, the answer is C.

20) We can put the information given into a table to help with answering this question:

	Apples	Oranges
Robinson	8 apples per hour	2 oranges per hour
Friday	1 apple per hour	4 oranges per hour

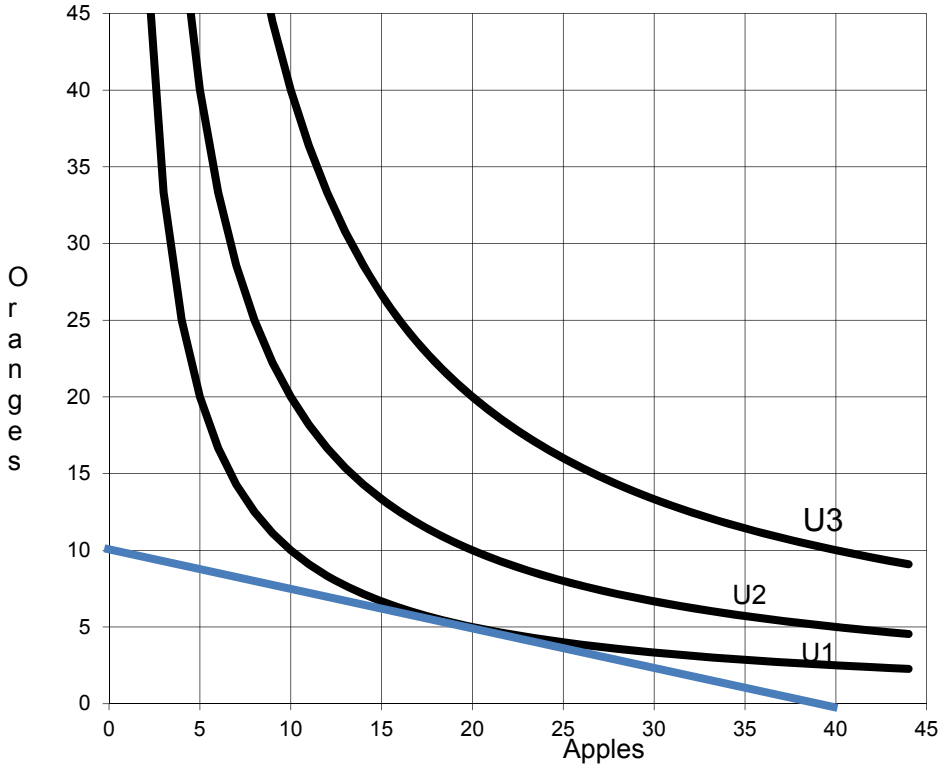
From this, we see that Robinson has the absolute advantage in apples and Friday has the absolute advantage in oranges, since they can produce more of those goods than the other person in an hour.

To find comparative advantage, we can find the opportunity cost of each good and write it into a table to make it easier to compare:

	Apples	Oranges
Robinson	1/4 oranges	4 apples
Friday	4 oranges	1/4 apples

From this table, we see that Robinson has the lower opportunity cost in apple and Friday has the lower opportunity cost in oranges. This means that Robinson has the comparative advantage in apples and Friday has the comparative advantage in oranges. The answer is B.

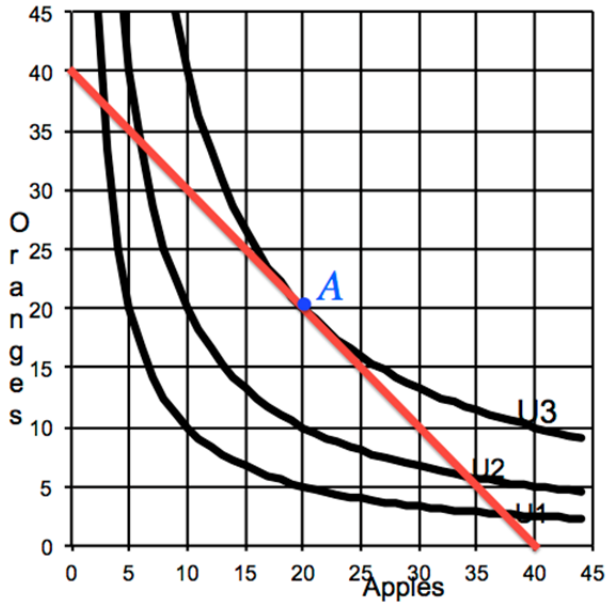
21) Using the information given about Robinson's time constraint and production information, we can plot his production possibility frontier to see how he would consume in autarky.



If Robinson spent his entire day (5 hours) working on apples, he would produce 40 apples, and if he spent the entire day on oranges, he would produce 10. Those are the two end points of the PPF. We see that the optimal point of consumption for Robinson is at 20 apples and 5 oranges, since that is a point that he can afford and be on the highest indifference curve possible. Therefore, the answer is D.

22) Supposing that trade is possible, then Robinson will specialize in producing apples, as he has comparative advantage in producing apples, and Friday will specialize in producing oranges, as he has comparative advantage in producing oranges. Hence, Robison will produce 40 apples, as he will allocate his five hours of labor into apple production. Since he produces 8 apples per hour, then the total number of apples produced is 5 hours * 8 (apples/hour)=40 apples. Similarly, Friday will produce 40 oranges. Given that the price of one apple in terms of orange equals one orange, then we can obtain the budget constraint of Robinson under trade, given by the red line in the graph. We can see that the 40 apples produced by Robinson correspond to the horizontal intercept of the budget constraint and the 40 oranges produced by Friday correspond to the vertical intercept of the budget constraint. Furthermore, the slope of the budget constraint is (-)1, which corresponds the price of one apple in terms of orange. The optimal consumption bundle is given by point A in the graph which corresponds to the point at

which the budget constraint is tangent to indifference curve I3. Hence, Robison consumes 20 apples and 20 oranges under trade.



The answer is C.

23) Under autarky, the equilibrium is given by the intersection in between supply and demand at point H in the graph. Hence the equilibrium price is F under autarky. The Consumer surplus under autarky corresponds to the area beneath the demand curve until the equilibrium price at F; this area corresponds to FHA. The Producer surplus under autarky corresponds to area above the supply curve up until the equilibrium price at F; this area corresponds to FHR. The total surplus equals the sum of consumer surplus plus producer surplus. This corresponds to the area RHA (includes both the consumer surplus, FHA, and the producer surplus FHR). Under free trade, the price in Econland will be equal to P^{world} =R. For this price, the area in between the supply curve and point R equals 0. Thus, under free trade producer surplus equals 0. Hence the change in producer surplus in between autarky and free trade is –FHR. On the other hand, at P^{world} =R, the consumer surplus is equal to the area bellow the demand curve until P^{world} =R. This area corresponds to RYA. The total surplus under free trade is equal to the consumer surplus, RYA, plus the producer surplus; the total surplus is equal to RYA. The difference in total surplus in between autarky and free trade is equal to +RHY, which is the difference in between RYA and RHA. The answer is D.

24) If the government of Econland sets a tariff on widgets imported equal to FR, then this means that the new widget price is P^{tariff} =F, as P^{tariff} = P^{world} +tariff. At this price, the quantity demanded of widgets in Econland is equal to T and the quantity of widgets supplied in Econland equals T. Thus there are no

imports. As there are no imports, then the government will not collect any money from this tariff. Thus the total revenue collected equals 0. The answer is E.

25) If the quota on widget imports equals the length of LN, then the total quota rights equals LNVX. Also, this policy generates a deadweight loss equal to RLV+NXY. In question 23, we found that the total surplus under free trade is equal to RYA. Given that the quota rights go to foreign firms and the fact that there is dead weight loss, then the change in total surplus from the quota policy is equal to -LNVX-RLV-NXY=-RLNY. The answer is E.

26) The market equilibrium is located at the intersection of the private marginal cost (supply curve) and the private marginal benefit curves (the demand curve). This corresponds to a quantity of T. The socially efficient quantity must take into account the negative externality. This means the social marginal cost is different from the private marginal cost, by shifting to the left. The new socially efficient equilibrium is located at the intersection between the social marginal cost and the social marginal benefit (whch, in this case, is the same as the private marginal benefit since there was no positive externality). This corresponds to a quantity of S. The answer is C.

27) Under free market, CS is AHF, while under tax of CL, CS is ACB. The change in CS is thus -BCHF.

Similarly, under free market, PS is FHR, while under tax, PS is KLF. The change in PS is

thus -FHLK. Under free market, external cost is FRHM. (which is a per unit external cost of F to R times the quantity of T). Under tax, external benefit is FCLR (which is a per unit external cost of F to R times the quantity of S. The change in external cost is thus CVHL. Here government pays a per unit

tax of CL for quantity S, thus government pays BCLK. The change in government surplus is +BCLK. Add them up, change in total surplus = FVHR. The answer is A.

28) The Pigouvian tax is a size of CL. This corresponds to a quantity of S. The government takes in a revenue of CL for each of the S units produced. This is the rectangle equivalent to BCLK. The answer is E.

29) The change from the market equilibrium from T to S results in a change in external cost of CVHL. The portion CHL is the change in CS +PS+GS. The other portion of the parallelogram is the change is the total surplus which is CVH. The answer is C.

30) In class, we studied firms that take advantage of large scale production, where marginal cost (the cost to produce one more unit) is low, but the fixed cost (such as research and development) is high. For these firms, the more they produce, the lower the average total cost will be per unit. This is the idea of increasing returns to scale. This is an example for firms like pharmaceuticals, aerospace (like Boeing, Airbus), discount retailing (like Walmart), and software companies (like Microsoft). House painting is not an example of increasing returns to scale. In fact, in class, we said that it was more like an example of constant returns to scale. The answer is E.

31) One of the observations made from the U-shaped average total cost curve is that when the marginal cost is below the average total cost, the average total cost curve is falling, and when marginal cost is higher than average total cost, then the average total cost is increasing. The intuition is this – when the cost to produce the next unit (marginal cost) is higher than the average unit (average total cost), then that will increase the average total cost. In the same way, when the next unit (marginal cost) is costing less to produce than the average unit (average total cost), then average total cost should be falling. The answer is A.

32) A rivalrous good is one where your consumption means someone else can't consume. An excludable good means that you can keep people from consuming that good. We see that the stock of fish in the ocean is a good that is rivalrous in consumption (since if you catch a fish, someone else can't catch that fish) and nonexcludable (since you can't keep people from going to the ocean and fishing). Therefore, the answer is A.

33) Preferences that exhibit fixed proportions are those where two goods are perfectly complementary – that is, you always want to consume that good with some amount the other good, and that ratio is fixed. Here, George's preferences are such that he values a meal, where a meal is one slab of meat and two potatoes. That proportion is fixed, and therefore George has preferences that exhibit fixed proportions (perfect complements). Martha, on the other hand, has preferences over meat and potato that are perfect substitutes. Perfect substitute preference means one good can always perfectly substitute for some amount of another good. Here, since Martha only cares about calories, some amount of potatoes can always substitute perfectly for meat. In this case, it's 1.5 potatoes per meat. Therefore, the answer is A.