Question 1

a.

		Player 2 H	Player 2 G
Player 1	H	+10, +10	0, +5
	G	+5, 0	+7, +7

b. No, if player one chooses to Hunt then player two should also hunt and if player one decides to gather then player two should most definitely gather as well. They have to do the same thing together to get the highest payoffs.

c. If both players choose to hunt (H, H) and if both players choose to gather (G, G) are in Nash Equilibria. If player one is hunting, player two also wants to hunt to maximize the payoff and will earn less if they go the other direction. The same is in the case if player one is gathering, player two wants to gather as well. Even if we take assumptions with player two first, player one wants to do the same thing to maximize the payoffs.

Question 2

a.

		Driver 2 Swerves	Driver 2 Straight
Driver 1	Swerves	-5, -5	-10, +10
	Straight	+10, -10	-50, -50

b. No. If driver one decides to go straight, driver two must swerve to avoid a crash and get the least penalty (best payoff). If driver one decides to swerve, driver two gets the best payoff if they go straight. If we consider the action of driver two first – if they choose to go straight, driver one must swerve, and if driver two swerves, then driver one must go straight to maximise payoffs.

c. If one driver swerves and the other goes straight – those are the two cases for Nash Equilibria. That is (Straight, Swerves) and (Swerves, Straight). This way one gets the most payoff and the other gets the least penalty (better payoff than the other cases).

Question 3

a.

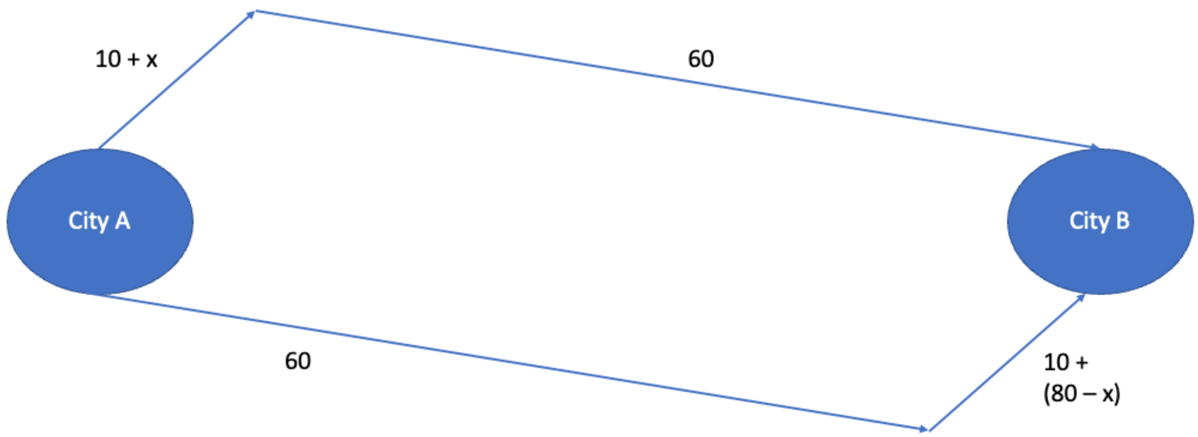
		Company 2 Low	Company 2 Increases
Company 1	Low	+16000, +16000	+12000, +20000
	Increases	+20000, +12000	+14000, +14000

b. Yes, both the companies have a dominant strategy to that of increasing their production for maximum payoffs regardless of the other company. If one of the companies decides to increase production, the other must increase to at least make equal profits. If one of the companies does not increase production, the other should again increase production to get maximum payoffs.

c. (Increase, Increase) is the only Nash Equilibria where both the company's profit. In every other case, the second company would want to do the opposite to maximize its payoffs.

Question 4

a.



b. Travel time for route I is 10 + x + 60, where x is the number of cars. The total number of cares here is 80. Therefore, 10 + 80 + 60 = 150. Hence, it will take 150 minutes for car to travel on route I.

c. As both total time for both the routes is '10 + number of cars travelled + 60', the Nash Equilibrium will be (40,40) here. Assuming 40 on route I and 50 on route II:

 Route I: 10 + 40 + 60 = 110
 Route II: 60 + 10 + 40 = 110
 Therefore,
 Drive Time/Car = 40 minutes
 Total Time = (110*40) + (110*40) = 8800 minutes

d. The time taken on both routes is equal as per the formula for any given car. If all the cars travel from one route, the time is maximum with 150 minutes. If cars are split equally on routes, the time goes the minimum possible of 110 minutes.

e. Route III: Local Street Route I + Local Street Route II
 =10 + Number of Cars + 10 + Number of Cars
 =10 + 80 + 10 + 80
 =180 minutes

f. Route IV: Highway Leaving City A + Highway Entering City B
 =60 + 60
 =120 minutes

g. Regardless the number of cars, the travel time for route IV will be 120 minutes. If all cars decide to take the same route, route IV will be the fastest. If all the cars take route III, it will take the most amount of time with 180 minutes.

h. Route I: 0 Cars = 0 minutes
 Route II: 0 Cars = 0 minutes
 Route III: 0 Cars = 0 minutes
 Route IV: 80 Cars = 120 minutes
 Total = 0 + 0 + 0 + 120 = 120 minutes
 Route IV is 120 minutes regardless of the number of cars. I will have all cars go through route IV. If I MUST assign cars to every route, then I will assign 77 to route IV and other

routes will have one each. This will bring the total time to (71 + 71 + 22 + 120) = 284 mins.

Question 5

The Alaskan Way is being rebuilt by the Washington State Department of Transport in Seattle. The freeway used to run through the city near the waterfront blocking all access from the city to the waterfront. The removal of this freeway made access for Downtown the waterfront and connected all the piers together. This project is a win for the people of Seattle as the city gets to enjoy the beautiful waterfront and new developments like parks in the area. These parks also host many major city festivals. Towns and cities were divided by these freeways when they were built before. Now, the city has to make a decision if to repair the freeways or tear them down for good of the city and its people. Highways construction also displaced minorities which is still a big concern. The removal of freeways also attempts to bring back what was displaced from the city. The freeways also force people to use cars in the city, which is an expensive affair for many people. It also attracts noise pollution in the city. Removal of freeways also promotes the expansion and development of areas around the city. New roads for cycle and pedestrians can also be introduced which is also an eco-friendly method.

Question 6

a. If our firm believes the true value of the item is $5000, we should bit very close to or equal to that amount. If we win, we pay the second-highest bid and the payoff is high, but if we lose – the payoff is zero. I we bid considerably low than the true value, we might lose the auction and if we bid considerably high and win, we might overpay for the item more than its true value.
b. It won't greatly matter how many members are in the auction as the strategy is to only bid to the closest actual value of the item. We can only hope our bid is higher than the other bidders but apart from that we have to stick to the true value bid and not care about how many bidders are there.

Question 7

a. P(Both bid 3) = ¼
   P(Both bid 1) = ¼
   P(1 & 3) = ½
   P(3 & 1) = ½
   Seller's Expected = ¼ + ¼ + ½ + ½ = 6/4

b. Outcomes:
   There are three bidders, and they can only bid 1 or 3. If we make a table of all possible outcomes, we can see that there are eight possible outcomes.

Bid	Revenue
(1,1,1)	1
(1,1,3)	1
(1,3,3)	3
(3,3,3)	3
(3,3,1)	3
(3,1,1)	1
(3,1,3)	3
(1,3,1)	1

   Expected Revenue = 1/8 + 1/8 + 3/8 + 3/8 + 3/8 + 1/8 + 3/8 + 1/8 = 16/8 = 2

c. As the number of bidders increased, the expected revenue increased as well. We can see this from the above two parts of question 7.