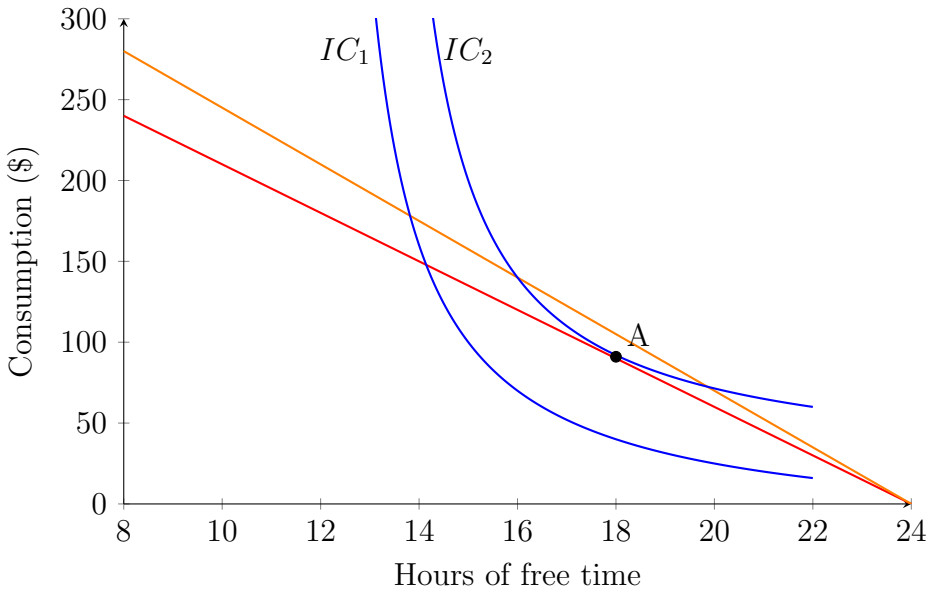
Suggested Midterm Answers.

1. Liz is deciding how much of her time to spend at work. A graph representing her tradeoff is shown below:



Hours of work	0	2	4	6	8	10	12	14	16
Free time, t	24	22	20	18	16	14	12	10	8
Consumption, c	\$0	\$30	\$60	\$90	\$120	\$150	\$180	\$210	\$240

(a) What is Liz's wage?

15 \$ per hour.

(b) What is Liz's marginal rate of substitution at point A?

At point A, MRS = MRT. MRT is the absolute value of the slope of the feasible frontier, or 15. So MRS = 15.

(c) Liz is currently working 10 hours every day. Describe the relationship between her marginal rate of transformation and marginal rate of substitution at this point.

At 10 hours per week, Liz is on a lower indifference curve than at point A. Therefore, MRS > MRT at 10 hours.

(d) Liz's boss notices that she's been working hard and gives her a raise. On the graph above, draw a new feasible frontier that Liz might face.

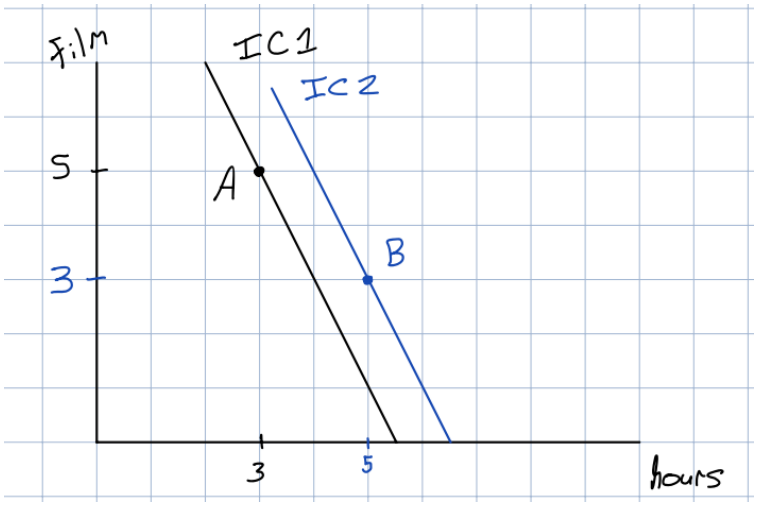
The new feasible frontier (orange line) should have a higher y-intercept (more potential consumption) and the same x-intercept at 24 hours of free time.

(e) Describe why we cannot know whether Liz will work more or less following her raise.

This depends on the relative magnitudes of the income and substitution effects. The income effect will be negative on hours worked, while the substitution effect will be positive.

2. Victoria is a photographer. Each roll of film shot costs her a \$10 for the film used and her time spent editing the photos has an opportunity cost of \$20 per hour.

(a) Victoria can produce a book of photographs with 5 rolls of film and 3 hours editing (technology A). Graph this point and an isocost curve that goes through it, with hours worked on the horizontal axis and rolls of film on the vertical axis. Label the isocost curve IC_1 and the point A.



$$C = wL + pK = 20 \cdot 3 + 10 \cdot 5 = 110$$

Finding the x-intercept of the \$110 isocost line: $110 = 20L \implies L = 5.5$ hours.

(b) Victoria can also choose to produce her book with a different camera (technology B). This camera takes larger photos, so she needs fewer rolls of film to finish the book, but it is harder to use, so she needs to spend more time editing. If it takes her 3 rolls of film and 5 hours editing to maker her book, graph this point (point B) and isocost curve IC_2 as well on the same graph as part (a).

$$C = wL + pK = 20 \cdot 5 + 10 \cdot 3 = 130$$

Finding the x-intercept: $130 = 20L \implies L = 6.5$ hours.

(c) Will Victoria choose technology A or technology B to produce her photo book?

Victoria will choose technology A since it's cheaper and on a lower iso-cost line.

(d) Due to tariffs, the cost of film goes up to \$15 per roll. Do Victoria's isocost curves get steeper or flatter? Why?

The slope of an iso-cost line is $\frac{W}{P}$. Thus, when the price of film increases, the iso-cost curves will get flatter.

(e) How much innovation rent does Victoria earn by switching technologies after the change in the cost of film?

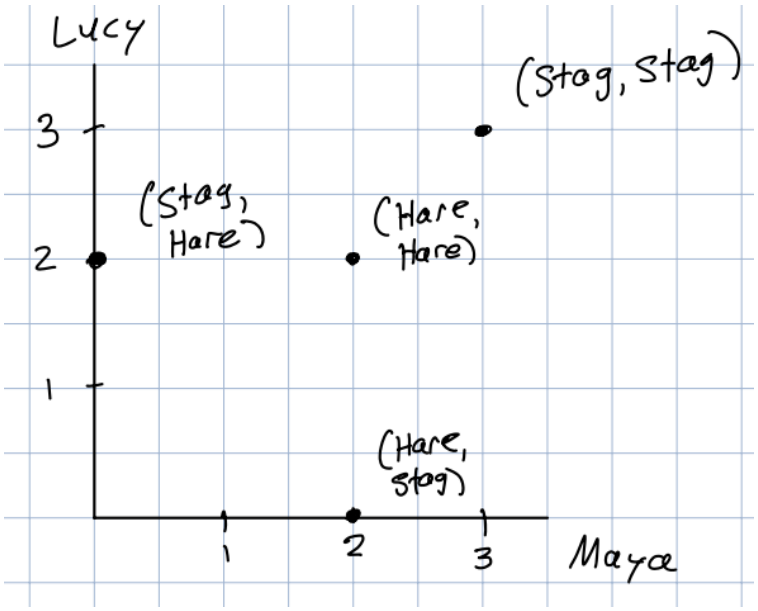
$$\text{Cost A} = 20 \cdot 3 + 15 \cdot 5 = 60 + 75 = 135$$
$$\text{Cost B} = 20 \cdot 5 + 5 \cdot 3 = 100 + 45 = 145$$

So, the innovation saving from switching from A to B is: $135 - 145 = -10$ (Note: There was a mistake in the question which is why the innovation rent is negative.)

3. In the game below, Maya and Lucy are going hunting. They can hunt for either a stag or hares. A stag is a large animal, and both Maya and Lucy must work together to safely hunt the stag. Either of them may safely hunt hares on their own. They cannot communicate with one another as they prepare for the hunt. Assume that all players are purely self-interested:

		Lucy	
		Stag	Hare
Maya	Stag	3,3	0,2
	Hare	2,0	2,2

(a) Draw a graph with Maya's payoff on the horizontal axis and Lucy's payoff on the vertical axis that shows the payoffs from each combination of strategies that can be selected.



(b) Which allocations are Pareto-dominated by another allocation?

Hare-Stag and Stag-Hare are Pareto dominated by Hare-Hare and Stag-Stag. Hare-Hare is Pareto dominated by Stag-Stag.

(c) Find all Nash Equilibria of this game.

There are two Nash equilibria: Stag-Stag and Hare-Hare.

(d) Are there any dominant strategies in this game?

There are no dominant strategies.

(e) Can we be certain that they both end up with a "good" result? Why or why not?

No, because there are no dominant strategies and the players cannot communicate and are fully self-interested.

4. Answer the following questions:

(a) Fill in the following table with an example of one good for each section:

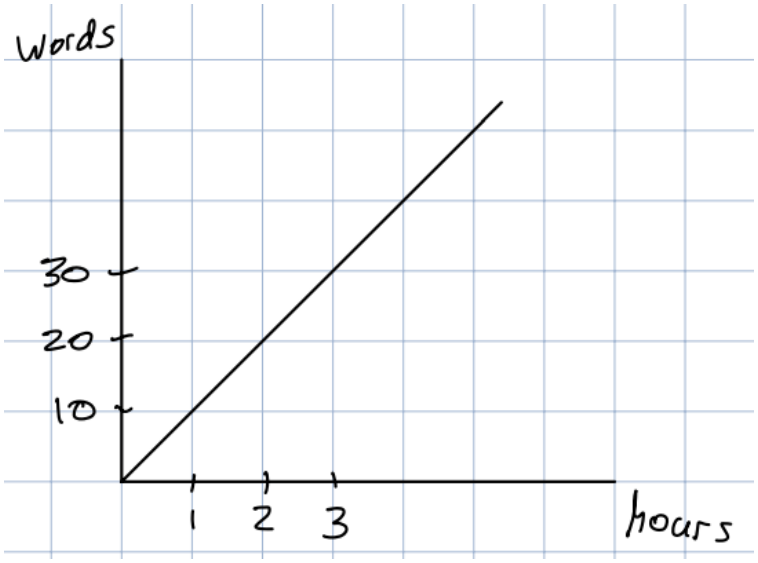
	Rival	Non-Rival
Excludable	Private goods: iPhone, Ferrari	Natural monopoly / Club goods: Swimming pool, country club
Non-excludable	Common resources: grazing fields, fish in lake	Public goods: street lamps, national defence

(b) Explain how social preferences can work to overcome the tragedy of the commons.

One possible answer: Altruism can lead to cooperative behaviour. In the prisoner's dilemma, cooperative equilibria are possible given enough altruism from each player.

(c) Noëlle is studying German. She can learn ten words of vocabulary for every hour that she studies. Draw Noëlle's production function.

Words learned = 10 × Hours studied.



(d) In no more than three sentences, give an example explaining why different countries have different comparative advantages in production.

Suggested answer: Countries have inherent qualities such as abundance of resources, labour, etc. For instance, France has CA in making wine due to rich their wine making history and favourable climate and soil. Similarly, Chile has CA in lithium production due to abundance of easily extractable lithium in the Atacama desert.