

國立中央大學 107 學年度碩士班考試入學試題

所別： 經濟學系 碩士班 不分組(一般生)

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科目： 個體經濟學

本科考試禁用計算器

*請在答案卷(卡)內作答

1. (10 points) Consider two lotteries X and Y , with the density functions $f(w)$ and $g(w)$ as follows respectively, where w denotes the wealth level,

$$f(w) = \begin{cases} 2w, & \text{if } 0 \leq w \leq 1 \\ 0, & \text{otherwise} \end{cases} \text{ and } g(w) = \begin{cases} 5w^4, & \text{if } 0 \leq w \leq 1 \\ 0, & \text{otherwise} \end{cases}$$

Note that for any two lotteries X and Y represented by the corresponding cumulative distribution functions F and G , X is said to first-order stochastically dominate Y if and only if $\int u(w)dF \geq \int u(w)dG$, where $u(w)$ is any *weakly increasing* utility function. That is, the decision maker with a *weakly increasing* utility function $u(w)$ would weakly prefer X to Y .

Given the above definition, it can be inferred that: ___ first-order stochastically dominates ___. Provide the proof for your answer.

2. (a) (7 points) Consider a two-good economy, and suppose that we observe a consumer's consumption bundles given the corresponding prices.

Consumption bundle $x_1 = (4, 8)$ at price $p_1 = (3, 2)$.

Consumption bundle $x_2 = (2, d)$ at price $p_2 = (1, 1)$.

Specify the condition for d so that it satisfies if and only if the weak axiom is *satisfied*.

- (b) (9 points) Consider the set of bundles below from another consumer,

Consumption bundle $x_1 = (6, 8)$ at price $p_1 = (1, 1)$.

Consumption bundle $x_2 = (11, 3)$ at price $p_2 = (1, 2)$.

Consumption bundle $x_3 = (7, d)$ at price $p_3 = (4, 1)$.

Specify the condition for d such that the weak axiom is *violated*.

注意:背面有試題



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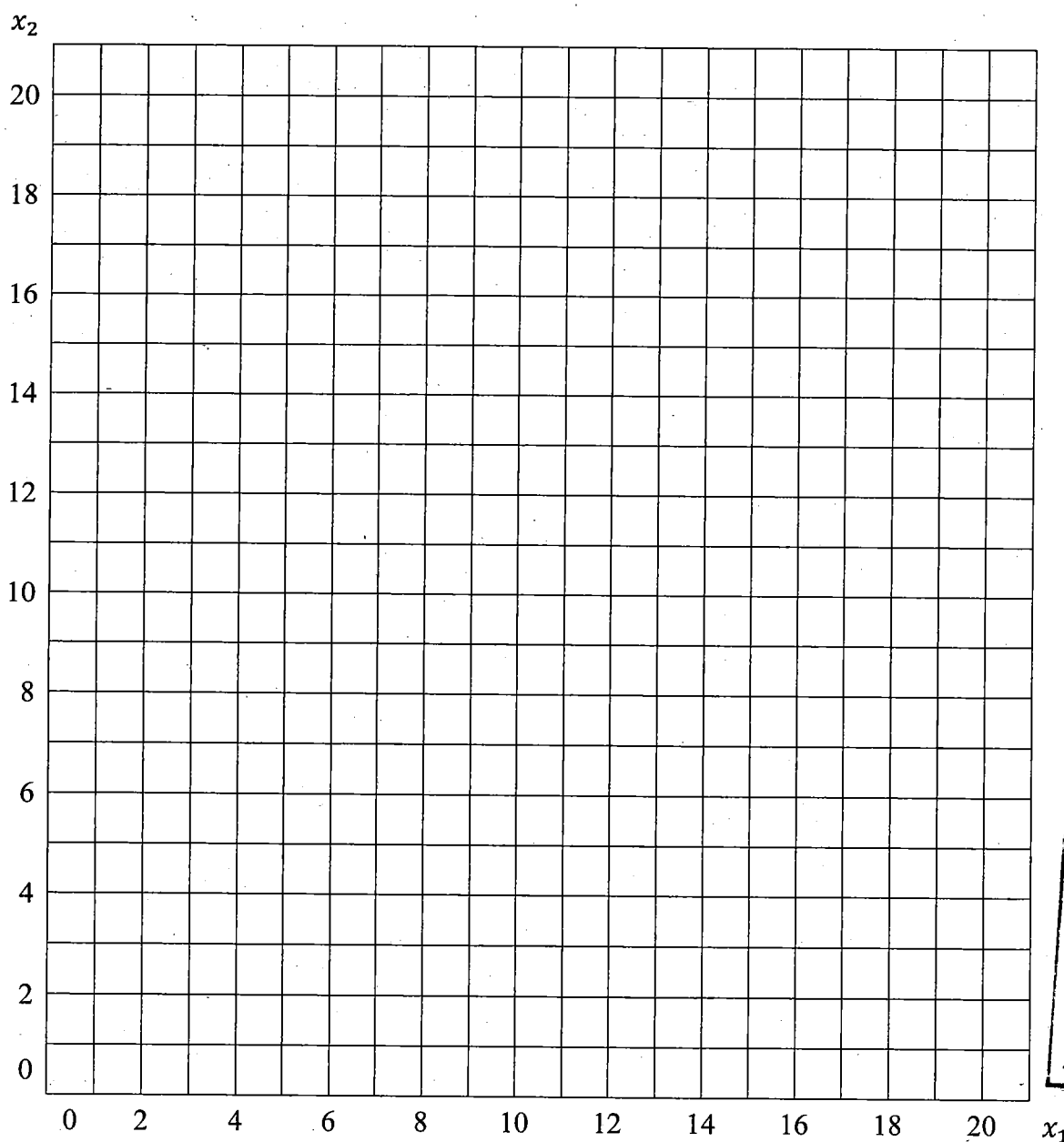
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3. (a) (4 points) Consider an agent with utility function given by $u(x_1, x_2) = x_1^{1/2} x_2^{1/2}$, and prices are given by $p_1 = 12, p_2 = 2$. Draw, on the answer sheet, the income expansion path in the grid using the format suggested as the graph below.
- (b) (8 points) Answer the above question when the utility is replaced by $u(x_1, x_2) = x_1 + \ln(x_1 + 0.5x_2)$.



參考用

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4. Fanny is planning to start a bakery. Her current wealth level is W . The bakery uses one input to produce one output, with the production function $f(k) = k$. The input costs 1 dollar per unit. The market price of the output is state-dependent. Specifically, there are two states ω_1 and ω_2 , where ω_1 realizes with probability q and ω_2 with probability $1-q$. In the state ω_1 , the output price is p_1 , while the output price is p_2 in the state ω_2 . Assume that Fanny's (Bernoulli) utility function is $u(x) = \ln(x)$.
- (a) (3 points) State Fanny's optimization problem.
- (b) (9 points) Suppose that $p_1 > 1$ and $p_2 < 1$. First, find the optimal amount of k , namely, k^* , and then specify the conditions such that k^* is positive. Finally, briefly discuss the underlying intuition of the conditions.
5. Every year there are a lot of hit and run car accident cases. Consider a car accident, there are a criminal and a victim. The criminal can decide to escape (a.k.a. hit and run) or not to escape. If he escapes, he will be arrested with probability p and will be fined X dollars for punishment. Denote the initial wealth as W , the medical expense as E which can only be avoided if the criminal escapes without being arrested. (25 points)
- (a) (5 points) Write down the condition which the criminal will NOT escape.
- (b) (5 points) From the condition you found in (a), show that there is a level of X that can deter hit and run.
- (c) (5 points) How this level vary with risk attitude of the criminal?
- (d) (5 points) Another way of reducing escape rate is to increase p . Is this also vary with risk attitude of the criminal?
- (e) (5 points) Compare these two methods, which is a more effective way to reduce hit and run?

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參考

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6. There are usually multiple plans you can choose from a telephone company. The plans that they provide usually come with a fixed part and a variable part. Consider the following two telephone plans. (25 points)

Plan	Monthly Fee	Call Charges
A	70	1.2 / 3 minutes
B	95	1.5 / 5 minutes

- (a) (5 points) Represent the total expense of plan A as a function of per minute call. Do the same for plan B.
- (b) (5 points) Draw a diagram to illustrate your solution in part (a), and find the intersection point.
- (c) (5 points) Explain how a rational consumer will make the choice between these two plans.
- (d) (5 points) Is there any private information known only to the consumers? How the company can learn this information?
- (e) (5 points) Why the company not just offer a simple price per minute plan?

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