The homework is due on Wednesday, September 30 at 4pm. Each questions is worth 0.8points. No partial credits.

Question 1 A utility function is given by $u(x_1, x_2) = \min\{2x_1, 5x_2\}$.

(a) Graph the indifference curves through the following points: $(10, 4)$, $(20, 20)$, and $(32, 12)$.

(b) Now suppose that prices are $p_1 = 2$, $p_2 = 1$, and that income is $I = 36$. Graph the budget line and determine the optimal choice graphically.

Question 2 A utility function is given by $u(x_1, x_2) = x_1 + x_2$. Suppose that income is $I = 80$, and prices are $p_1 = 4$, $p_2 = 2$. Then the price of good 2 increases to $p_2 = 5$. Determine by what percentage the person's income must be increased such that the person is equally well off after the price increase. Determine the solution graphically.

Question 3 A utility function is given by $u(x_1, x_2) = \min\{x_1 + 3x_2, 2x_1 + 2x_2\}$. Suppose prices are $p_1 = 1$, $p_2 = 2$. The persons income is $I = 28$. Then the price of good 2 increases to $p_2 = 4$. Determine by what percentage the person's income must be increased such that the person is equally well off after the price increase. Determine the solution graphically.

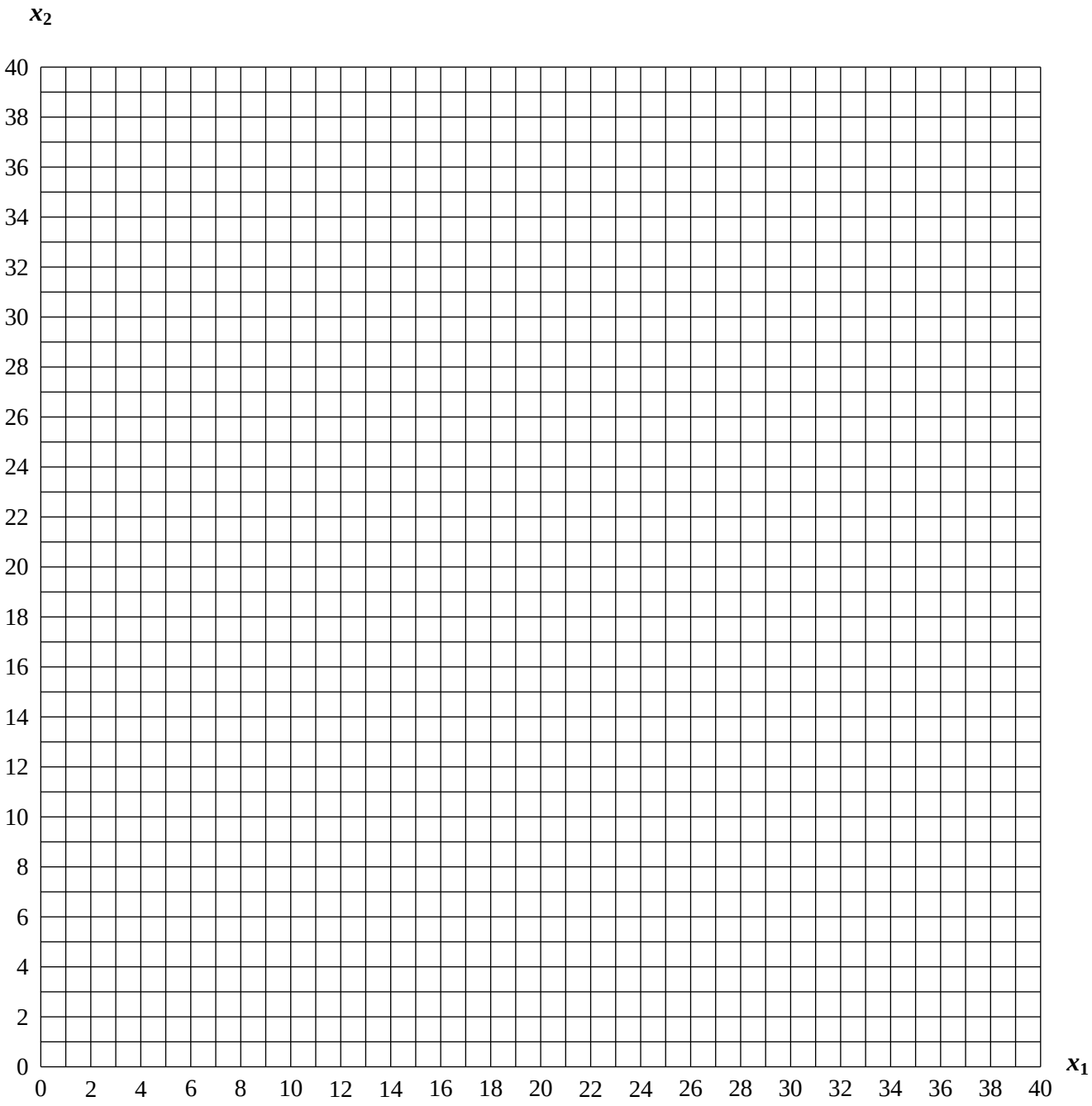
Question 4 Suppose that there are two goods. Originally prices are $p_1 = 2$, $p_2 = 1$, and income is 30. Suppose the government imposes a tax of 2 Dollars on good 2, raising the price to $p_2 = 3$. The government returns the tax revenue to the consumer in terms of a lump sum subsidy. Determine the overall effect on the consumer for the two preferences listed below. Make separate graphs.

(a) $u(x_1, x_2) = x_1 + x_2$.

(b) $u(x_1, x_2) = \min\{x_1, x_2\}$.

Question 5 Suppose utility of a person over food, x_1, housing, x_2, and other items, x_3 is $u(x_1, x_2, x_3) = x_1^{0.2} x_2^{0.5} x_3^{0.3}$. Prices last year were $p_1 = 4$, $p_2 = 3$, $p_3 = 6$. The person's income is $I = 100$. Suppose that prices this year are $p_1 = 3$, $p_2 = 5$, $p_3 = 7$. How much money would the person need this year to be exactly as well off as last year.

Specify all optimization problems. Compute the solutions by using Excel (attach a printout of the spreadsheet).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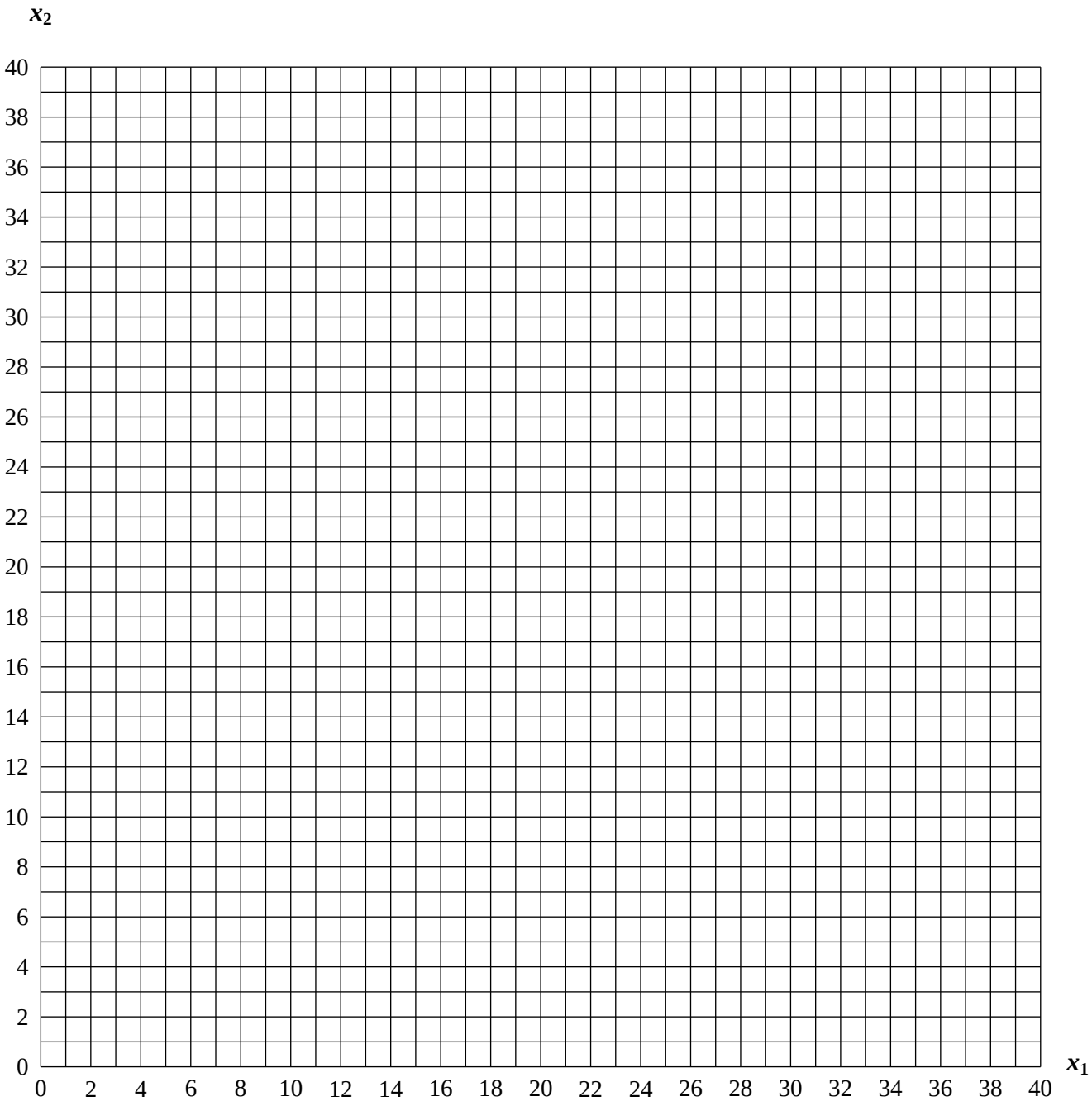
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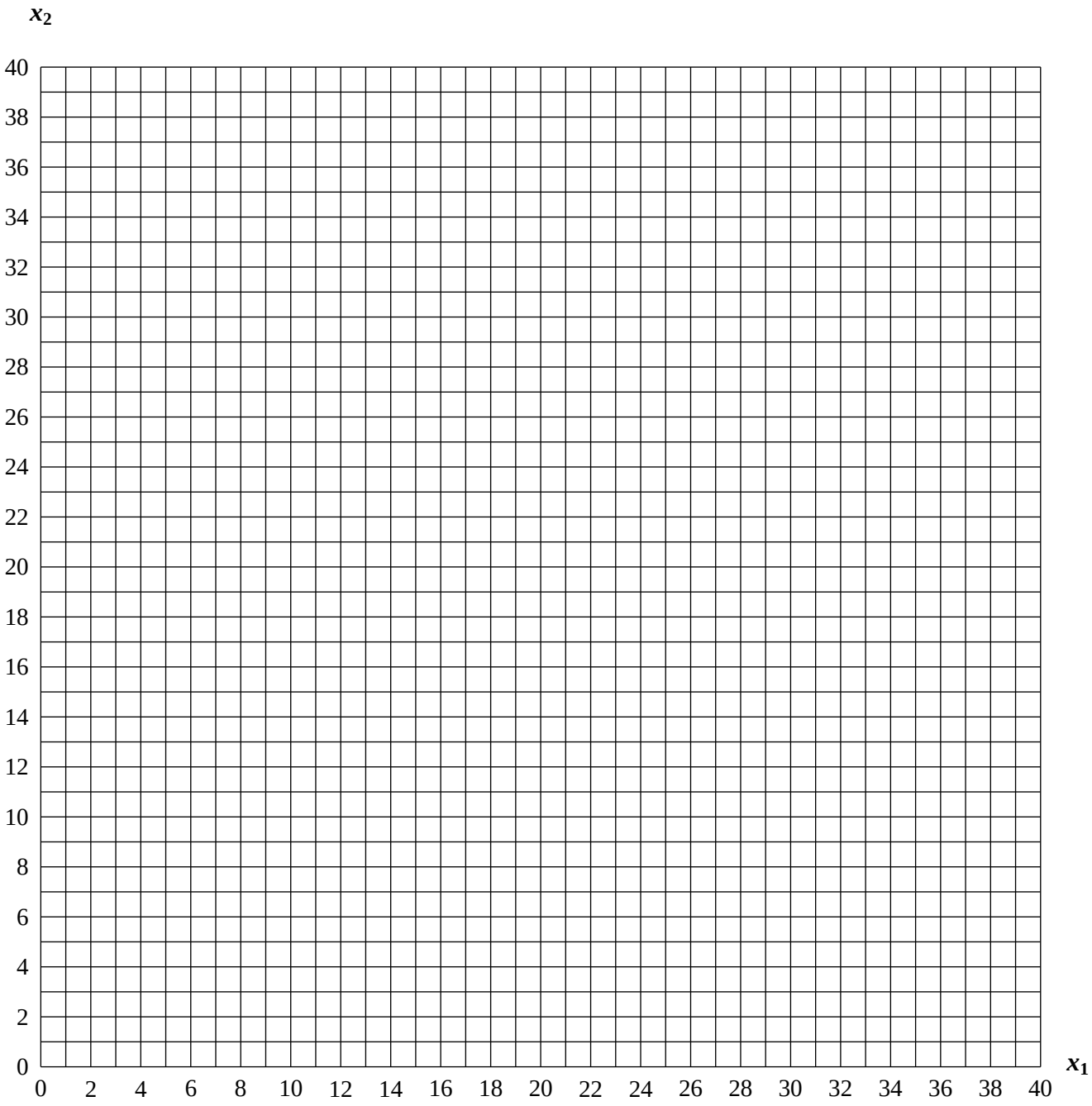
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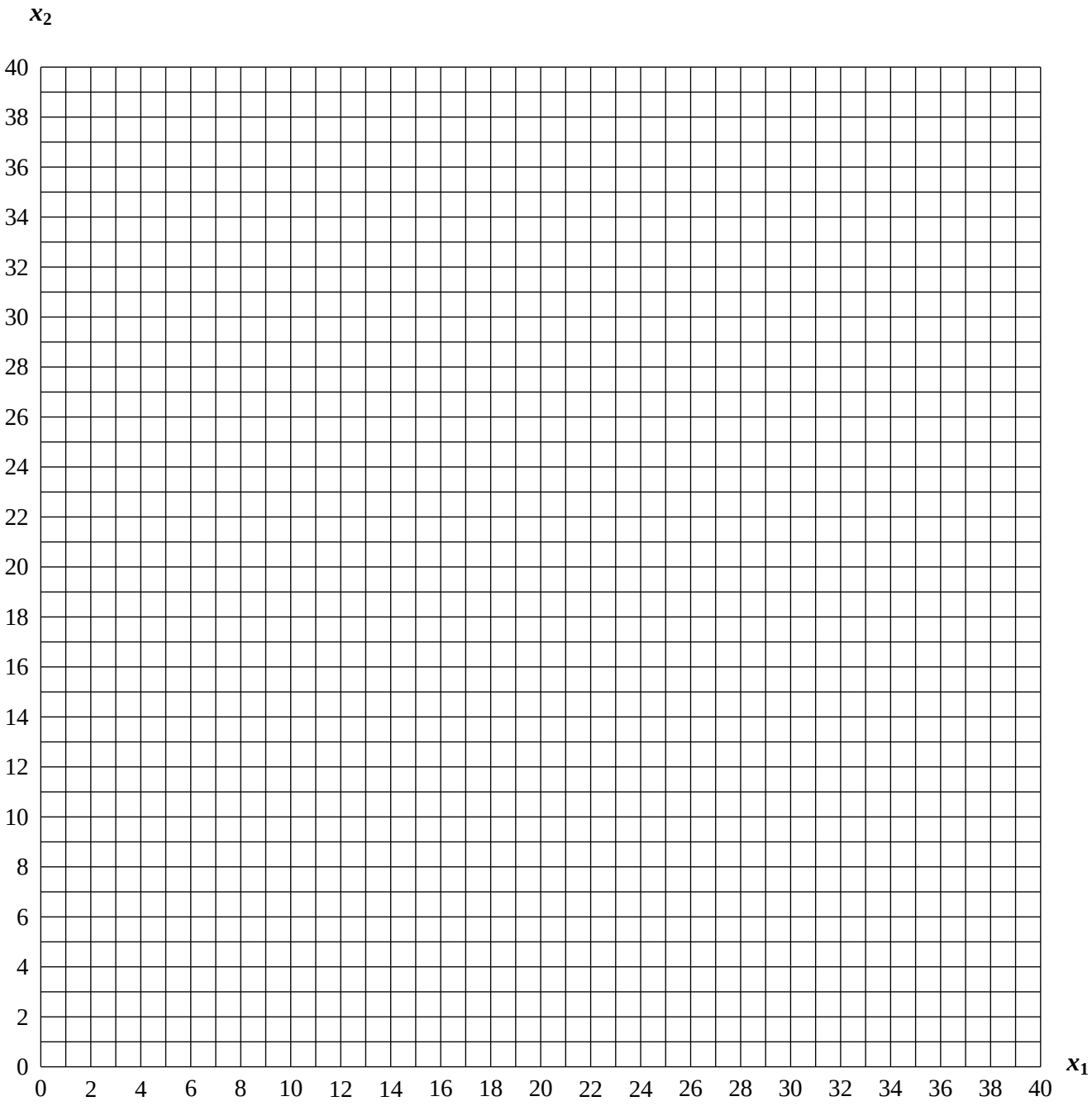
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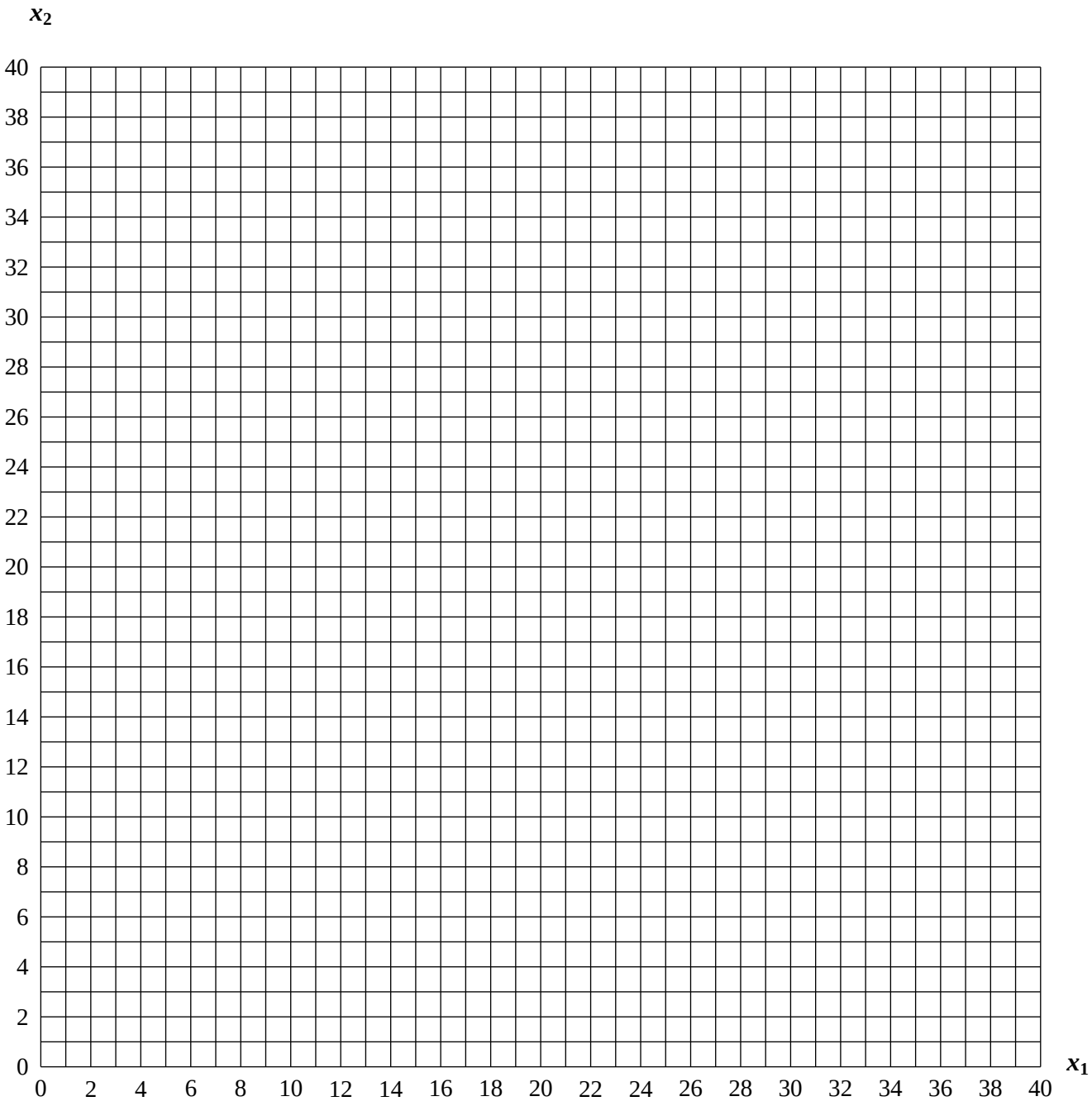
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