Name:

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All questions must be answered on this test form!
For each question you must show your work and (or) provide a clear argument.
All graphs must be accurate to get credit.
If you need scratch paper, use the last page or the back of the form.

Question 1

(a) Suppose that $p_1/p_2 = 2$ and that $(6, 14)$ is on the budget line. Then

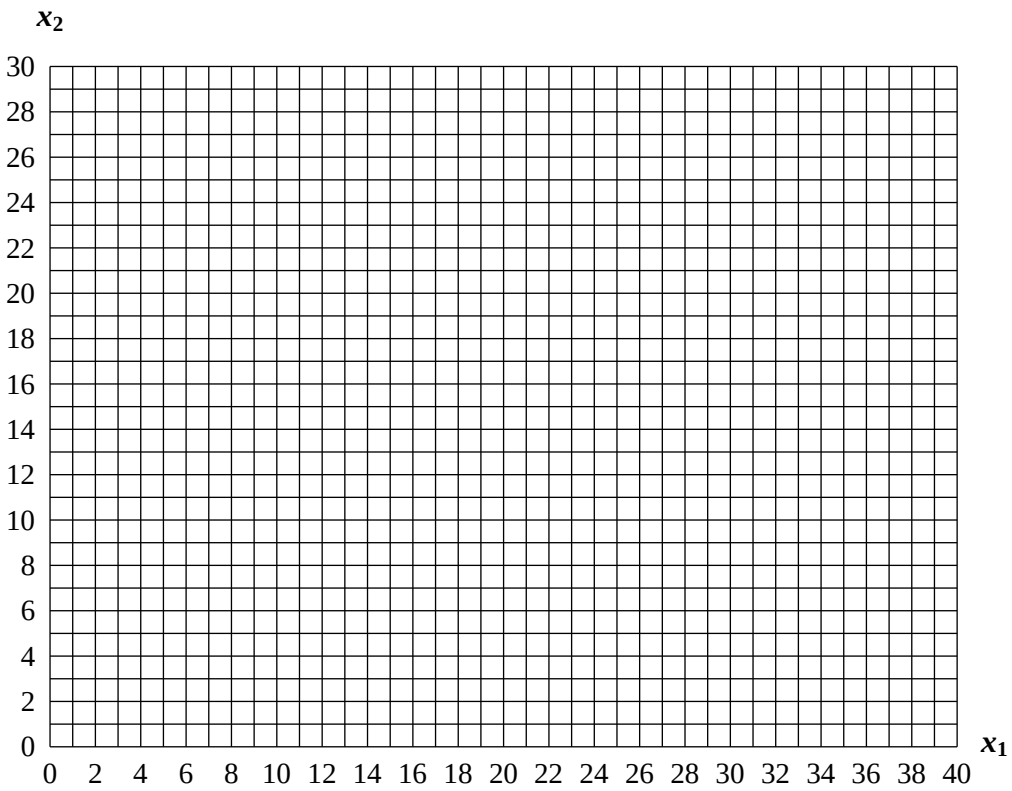
(0,), (10,), and (, 0)

are also on the budget line. (*Fill in the missing numbers*) *6 points*

(b) Now suppose that for a different consumer and different prices $(10, 12)$ and $(8, 15)$ are on the budget line, and that the person's income is $m = 540$. Then *6 points*

$p_1 =$, $p_2 =$

You can use the grid below to help you find the answers.



Question 2 Suppose that there are two goods. The price of each unit of good 2 is 2 Dollars. The price of good 1 depends on the quantity purchased. That is, if a person buys up to 10 units, then the price of each unit is 5 Dollars. If the person buys more than 10 units, then the first 10 units are still priced at 5 Dollars per unit, while each additional unit is priced at 50cents per unit. Suppose that the person's income is $m = 200$.

Then the following points are on the budget line

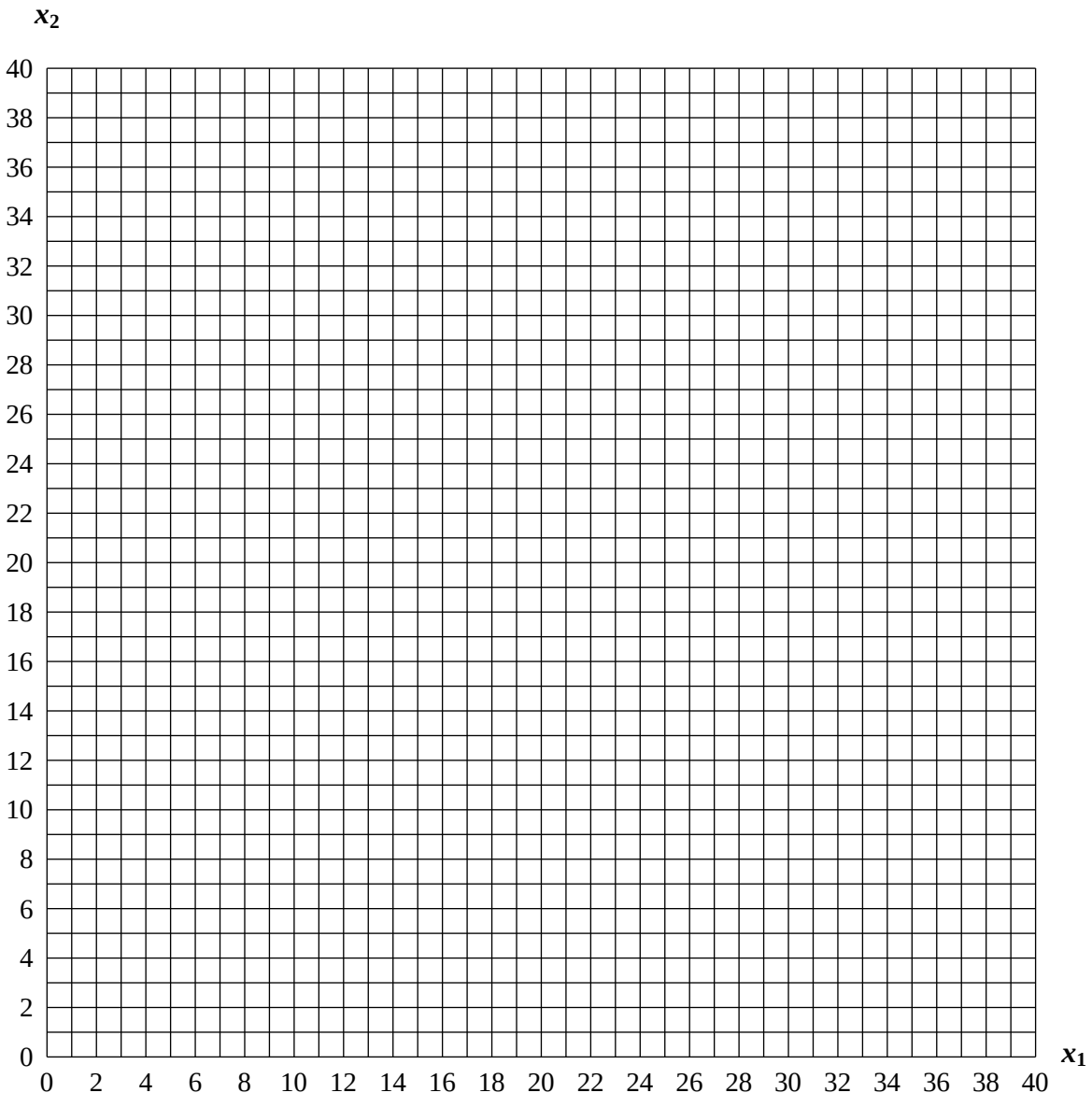
(0,), (10,), (30,), and (, 0)

(*Fill in the missing numbers*) *8 points*

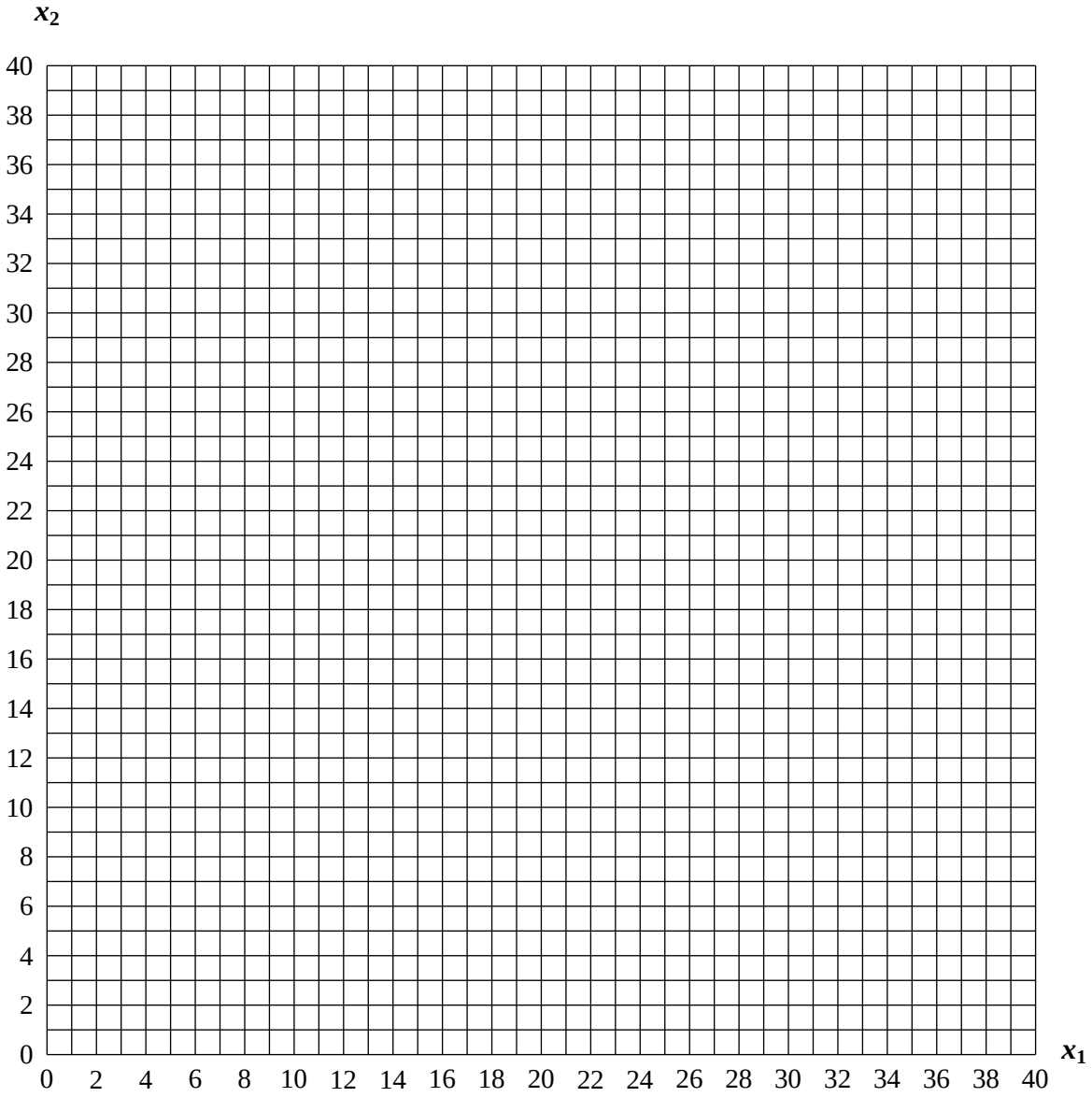
The slope of the budget line is ☐ when $x_1 < 10$, and ☐ when $x_1 > 10$. *4 points*

Question 3 A utility function is given by $u(x_1, x_2) = x_1^2 x_2$. Suppose that prices are given by $p_1 = 1$, $p_2 = 2$.

1. Compute the income offer curve and graph it in the grid below. *6 points*
2. Now suppose that the person's income is $m = 18$. Graph the budget line in the grid below. *3 points*
3. Thus, the optimal consumption is $\boxed{x_1 = \qquad\qquad , x_2 = \qquad\qquad}$ *3 points*



Question 4 A utility function is given by $u(x_1, x_2) = \min\{x_1, 4x_2\}$. The price of good 2 is $p_2 = 1$. The price of good 1 is non-linear. In particular, if the person consumes less than 10 units, the price is 3 Dollars per unit. If the person consumes more than 10 units, then the first 10 units still cost 3 Dollars per unit, however, every additional unit costs 1 Dollar. Suppose that income is $m = 40$. Graph the budget line in the grid below. *Clearly indicate the budget set by shading it*. Determine graphically the optimal consumption, and graph the indifference through the optimal consumption choice. The optimal consumption is $\boxed{x_1 = \qquad\qquad , x_2 = \qquad\qquad}$ *14 points*



Question 5

1. A utility function is given by $u(x_1, x_2) = x_1^3 x_2$. Then *6 points*

MRS =

2. Now suppose that the utility function is $u(x_1, x_2) = (x_1^{-2} + 2x_2^{-2})^{-1/2}$. Then *6 points*

MRS =

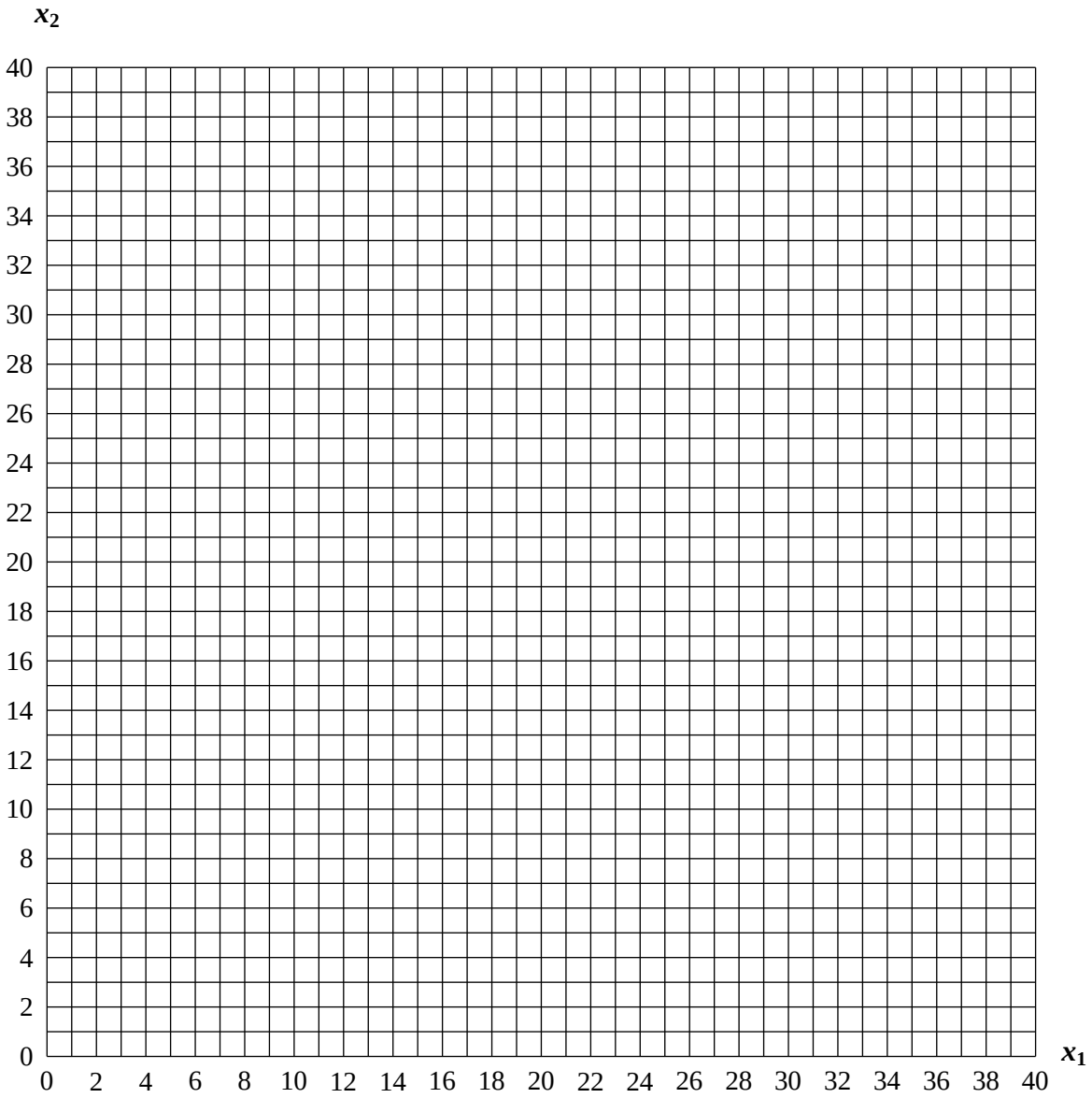
Question 6 A consumer's utility function $u(x_1, x_2)$ has a MRS given by

$$\text{MRS} = \frac{x_2^2}{x_1^2}.$$

Suppose that prices are $p_1 = 4$, $p_2 = 1$ and that the person's income is $m = 90$.

Then the optimal consumption is $\boxed{x_1 = \qquad\qquad , x_2 = \qquad\qquad}$ *14 points*

Question 7 A utility function is given by $u(x_1, x_2) = \min\{2x_1, x_1 + 2x_2\}$. Graph the indifference curve through $(10, 30)$ in the grid below. Further, suppose that at prices $p_1 = 1$, $p_2 = 4$ and income m, the optimal consumption is on this indifference curve. Then the optimal consumption is $x_1 =$, $x_2 =$, and income is $m =$. *12 points*



Question 8 Joe visits an amusement park. His utility function is given by $u(x_1, x_2) = 10x_1 - x_1^2 + x_2$, where x_1 is the number of rides and x_2 the amount of money he spends on other items.

(a) Suppose the price of a ride is $p = 2$. Then he will take $x_1 =$ _____ rides and spend \$ _____ at the park (*You do not need to know income m to answer this question.*). *4 points*

(b) Now suppose that the amusement park decides to charge a fixed entrance fee F instead of a price per ride. A visitor who pays the fee can take as many rides as he/she wishes (i.e., after F has been paid, the price per ride is zero). Then the person will take $x_1 =$ _____ rides. *4 points*

(c) (*Difficult*) Determine the maximum entry fee F a person with the above preferences would be willing to pay to enter the park (if the person does not pay F then he cannot enter the park and $x_1 = 0$). $F =$ _____ *4 points*

Scratch Paper: Not Graded