Exam code: 0

Bar-Ilan University

Department of Economics

Mathematics for Economists 66-111-18

Final Examination, Second Term, Moed B - 1/9/2015

The Disciplinary Committee warns!

It is forbidden to remove the questionnaire from the exam room or copy it or photocopy it or mark it with a magic marker. It is absolutely forbidden to go to the bathroom. Once you have received the questionnaire/notebook, you must take the exam and return it. You may leave the exam room only after half an hour. It is forbidden to talk during the exam. Please comply with the supervisor's instructions. Remove electronic devices, beeper and mobile phone. Holding a mobile phone, even if turned off, will lead to immediate invalidation of the exam. A student who will be found with forbidden auxiliary material or who will be caught cheating will be severely punished and may even be expelled from the university. A complaint will be submitted to the discipline committee against anyone transgressing these instructions.

I herewith declare that I have read and understood the instructions on the questionnaire and that I have no material in my possession that is forbidden for use.

ID number: Signature:

Dr. Z. Hellman

Exam Duration: 3 hrs.

Instructions

1. Read each question carefully. Answer all 15 multiple choice questions on the special answer sheet provided.
2. It is permitted to use a hand calculator only.

GOOD LUCK!

Question 1

The limit of the function $\lim_{x\to 0}(e^x+x^2)^{\frac{1}{e^x-1-x^2}}$ is:

1. e
2. 1
3. 0
4. None of the other answers are correct

Question 2

The limit of the function $\lim_{x\to 0}\dfrac{(e^x-1)(e^{2x}-1)}{x^2}$ is:

1. 2
2. 0
3. e^2
4. None of the other answers are correct

Exam code: 0

Question 3

The solution of the integral $\int \frac{x^3-4}{x^3+5x^2+4x}dx$ is:

1. $x - \ln|x| - 5\frac{2}{3}\ln|x+4| + 1\frac{2}{3}\ln|x+1| + c$
2. $\ln|x|\ln|x+4|\ln|x+1| + c$
3. The integral is insoluble
4. None of the other answers are correct

Question 4

Let the integral $\int_0^1 \int_0^{x^2} f(x,y)dydx$ be given.

Claim A: if $f(x,y) = 1$ then the above integral equals $\int_0^1 x^2 dx$.

Claim B: for all $f(x,y)$, the above integral equals $\int_0^1 \int_{\sqrt{y}}^1 f(x,y)dxdy$

1. Both claims are correct
2. Only Claim A is correct
3. Only Claim B is correct
4. Both claims are incorrect

Question 5

The solution of the integral $\int_0^4 x|x^2-4|dx$ is:

1. 40
2. 32
3. 36
4. None of the other answers are correct

Question 6

The solution of the integral $\int_1^4 \sqrt{x}\ln x dx$ is:

1. $(16/3)\ln 4 - 28/9$
2. $(1/4)\ln 4 - 1/2$
3. $4\ln 2 - 1.5$
4. None of the other answers are correct

Question 7

Let the function $f(x) = \ln \dfrac{x^2-1}{x^3}$ be given.

Claim A: The domain of definition of the function is $x > 1$

Claim B: The function has two maximal points

1. Both claims are incorrect
2. Only Claim A is correct
3. Both claims are correct
4. Only Claim B is correct

Question 8

Let the function $f(x) = x - 2\ln x$ be given. Then:

1. The function attains a minimum at the point $x = 2$
2. The line $y = x$ is a right asymptote of the function
3. The line $y = -x$ is a left asymptote of the function
4. The function is concave throughout its domain of definition

Question 9

The function $f(x, y) = 14x^2 + 28xy^2 - 56y$ has:

1. A saddle point at (-1,-1)
2. A minimum point at (-1,-1)
3. A minimum point at (1,1)
4. A saddle point at (0,0)

Question 10

Using differentials, an approximate value of $\ln(\sqrt[3]{8.02} + \sqrt{0.97} - 2)$ is calculated as:

1. -0.0133
2. -0.0135
3. 0
4. 0.0130

Question 11

Let $f(x, y)$ be a differentiable function. Suppose that $f(t, t^2) = 1$ for all t, and that $f_x(2, 4) = 2$. Then $f_y(2, 4)$ is (hint: differentiate the function f by t):

1. -0.5
2. 0.5
3. There is insufficient information to answer this question
4. None of the other answers are correct

Question 12

Let $g(x, y) = x^2 f(e^{x/y})$ be a differentiable function, where f is a differentiable function of one variable. Then $xg_x(x, y) - yg_y(x, y)$ is:

1. $2g(x, y) + \frac{2x^3}{y} e^{x/y} f'(e^{x/y})$
2. $2g(x, y)$
3. There is insufficient information to answer this question
4. None of the other answers are correct

Exam code: 0

Question 13

The Taylor series expansion of $x/(x-1)$ around the point $x=2$ is:

1. $2-(x-2)+(x-2)^2-(x-2)^3+...$
2. $2+(x-2)+\frac{(x-2)^2}{2!}+\frac{(x-2)^3}{3!}+...$
3. $2-x+x^2-x^3+...$
4. None of the other answers are correct

Question 14

The limit of $\lim_{(x,y)\to(1,0)} \frac{xy}{x^2+y^2-1}$ is:

1. Undefined
2. 0
3. ∞
4. None of the other answers are correct

Question 15

Let $f(x,y)$ be a two-variable function that is homogenous of order 4.

Assume that $f_y(1,-2)=3,\ f_x(-1,2)=5$. Then $f(1,-2)$ is:

1. -2.75
2. 0.25
3. -11
4. None of the other answers are correct