

Econ 300
Spring 2013

First Midterm Exam
version W

This exam consists of 25 multiple choice questions. The maximum duration of the exam is 50 minutes.

1. In the spaces provided on the scantron, write your last name, then your first name, and also be sure to include university identification number.
2. Also fill in the bubbles below your name and id number.
3. In the “special codes” section of the scantron under “K” write the letter W
4. DO NOT OPEN this exam booklet until you are told to do so and STOP writing when you are told that the exam is over. Failure to comply will result in a 10% loss in the grade.
5. You **MUST** return this exam booklet with the scantron; otherwise no credit will be awarded.
6. Only the answers you provide on the scantron will be counted towards your grade.
7. Please make sure you have use dark pencil marks to indicate your answer; the scantron reader may not give you credit for an answer if it can’t detect it.
8. Choose the single best possible answer for each question.

You are responsible for upholding the University of Maryland Honor Code while taking this exam.

1. Consider the following system where the endogenous variables are x and y and where c is exogenous.

$$0 = 3c - x - 2y$$

$$1 = \frac{2}{3}(y - c)$$

What is the impact on x due to an increase in c of 2 units ($\Delta c = 2$)?

- A. 1
- B. -4
- C. 2
- D. -2
- E. None of the above

2. $f(x) = \frac{(x-2)(x+2)}{x-1} + \ln x$ is a continuous function if the domain is

- A. $[1,5)$
- B. $(-\infty,2)$
- C. $(0,1)$
- D. All of the above
- E. None of the above

3. Simplify $\ln(e) * \ln\left(\frac{1}{e^{10}} [x^\alpha y^{-\beta}]^3\right)$

- A. $1 - 30 \frac{\alpha \ln x}{\beta \ln y}$
- B. $10 + 3(\alpha \ln x - \beta \ln y)$
- C. $-10 + 3(\alpha \ln x - \beta \ln y)$
- D. $\frac{3}{10} \frac{\alpha \ln x}{\beta \ln y}$
- E. None of the above

4. Total revenue = $P \cdot Q$, where $P = 5 - Q$. The average rate of change of total revenue is

- A. $5 - 2Q - \Delta Q$
- B. $5 - 2Q - P$
- C. $5 - 2Q - 2\Delta Q$
- D. $5 - 2Q$
- E. None of the above

5. The function $y = 10 - 2x + 4x^2$ is

- A. Concave
- B. Convex
- C. Linear
- D. All of the above
- E. None of the above

6. The difference quotient of $y = 3x^2 + x + 7$ is

- A. $2x + \Delta x$
- B. $3x + 3\Delta x + 1$
- C. $6x + 3\Delta x + 1$
- D. $6x + 6\Delta x + 1$
- E. None of the above

7. How many years does it take for \$30 to grow to \$60 with 15% interest and continuous compounding?

- A. 3.5
- B. 4.6
- C. 7.3
- D. 2.7
- E. None of the above

8. Let $\begin{cases} y = 10 - 24w \\ x = 6 - 8w \\ x = y \end{cases}$. Then,

- A. $w = 1/4$
- B. $x = 4$
- C. $y = 4$
- D. All of the above
- E. None of the above

9. Your mutual fund increased in value from \$10 to \$50 over the last 10 years. What was the average annual return with continuous compounding for the mutual fund over the 10-year period?
- A. 10%
 - B. 15%
 - C. 16%
 - D. 20%
 - E. None of the above
10. Suppose you have diminishing marginal utility: each additional dollar is worth a little bit less than the dollar before. Your utility function
- A. is convex
 - B. has an increasing slope
 - C. is concave
 - D. All of the above
 - E. None of the above
11. The roots of the equation $3x^2 + x - 10$ are
- A. $\{-2/3, 2\}$
 - B. $\{-2, 5/3\}$
 - C. $\{-1, 1/3\}$
 - D. $\{-1/3, 2\}$
 - E. None of the above
12. Consider the function $y = 3K^{1/2}L^{1/2}$, where y is output, K is capital and L is labor. A formula for the isoquant is
- A. $L = y/9K$
 - B. $K = y^2/9L$
 - C. $K = y/9L$
 - D. All of the above
 - E. None of the above

13. What is the present value of a discount bond with face value \$1000 which matures in 5 years at 8% annual interest compounded yearly? (discount bond pays face value in maturity. It does not pay periodic interest)

- A. \$670.32
- B. \$680.58
- C. \$1469.33
- D. \$1491.82
- E. None of the above

14. Suppose a utility function is $u(x) = x^\beta$, where $0 < \beta < 1$, then

- A. Marginal utility is increasing.
- B. Marginal utility is decreasing.
- C. Marginal utility is constant.
- D. All of the above
- E. None of the above

15. Suppose you have two options. First option is to deposit \$1000 into the bank account which gives interest twice per year with annual interest rate 6% for two years. The other option is to deposit \$1000 to the bank with continuous compounding at the yearly interest rate 5.5% for two years. Which statement is correct?

- A. Option 1 yields higher return
- B. Option 2 yields higher return
- C. Both option 1 and option 2 yield same return
- D. All of the above
- E. None of the above

16. Revenue is $R(x) = 5x^2 + 10 + 5x - 15x^2$. Marginal revenue is

- A. $10 - 20x$
- B. $5x - 30x$
- C. $10x + 5 - 30x^2$
- D. All of the above
- E. None of the above

17. Revenue is $R(x) = 5x^2 + 10 + 5x - 15x^2$. Revenue is maximized at

- A. $x = 1/6$
- B. $x = 1/4$
- C. $x = 1/5$
- D. $x = 1/2$
- E. None of the above

18. Consider the following system. Supply: $Q = 3P - 2$; Demand: $Q = 8 - 2P$. The equilibrium quantity and price are

- A. (6, \$2)
- B. (4, \$3)
- C. (1, \$5)
- D. (3, \$7)
- E. None of the above

19. Suppose $f(x) = 1 + 3x + 2x^2$. Then

- A. The derivative of f is increasing in x
- B. f is strictly convex
- C. The average rate of change of f increases in x
- D. All of the above
- E. None of the above

20. Suppose the function f is strictly monotonic. Then

- A. f must have an inverse
- B. f must be strictly concave or strictly convex
- C. f must be continuous
- D. All of the above
- E. None of the above

21. The average rate of change is to _____ as the derivative is to _____.

- A. tangent line; secant line
- B. secant line; tangent line
- C. velocity; acceleration
- D. acceleration; velocity
- E. all of the above

22. Why do economists use math?

- A. Because it is confusing
- B. Because it is difficult
- C. Because it is useful
- D. All of the above
- E. None of the above

23. Let $y = 40 - 4x + 2x^3$. The differential of y is

- A. $6x^2 - 4$
- B. $-4 + 6x^2 + 6x\Delta x + 2\Delta x^2$
- C. $(6x^2 - 4)dx$
- D. $6x$
- E. None of the above

24. The circular flow diagram is an example of a general equilibrium model if

- A. All variables are endogenous
- B. All equations are solved simultaneously
- C. Both factor and product markets are modeled together
- D. All of the above
- E. None of the above

25. Which function is *not* continuous on the domain $[0, \infty)$?

- A. $y = 12x^2 - 24x - 14$
- B. $y = \ln(e^{2x})$
- C. $y = \begin{cases} e^x + \ln(2x) & \text{if } x > 0 \\ 0 & \text{if } x = 0 \end{cases}$
- D. All of the above
- E. None of the above