Econ300 First Midterm Exam
Spring 2014 version W Answers

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 scrantron 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. Why do economists use math?

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

2. A function

   A. Is a mapping from each point in the domain to a point in the range
   B. Shows how the independent variable depends on the dependent variable
   C. Maps each point in the domain into one or more points in the range
   D. All of the above
   E. None of the above

3. The function $y = 10 - 2x$ is

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

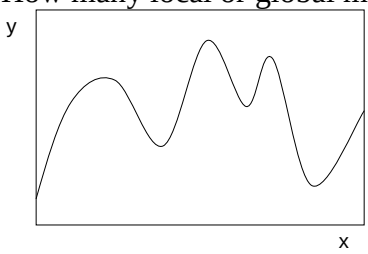
4. The roots of the equation $2x^2 - 2x - 4 = 0$ are

   A. {0, 2}
   B. {–1, 2}
   C. {–1, 1}
   D. All of the above
   E. None of the above

5. Consider the function $y = 4K^{1/2}L^{1/2}$, where y is output, K is capital and L is labor. A formula for the isoquant is

   A. $L = y/16K$
   B. $K = y^2/16L$
   C. $K = y/16L$
   D. All of the above
   E. None of the above

6. How many local or global minimums does the function below have?



A. 1
B. 2
C. 3
D. 4
E. None of the above

7. Which function is *not* continuous on the domain [0, ∞)?

A. $y = x^2 - 2x + 4$
B. $y = e^x + \ln(e^{2x})$
C. $y = \ln(2x)$
D. All of the above
E. None of the above

8. The function f is concave if and only if

A. f is at or below all secant lines
B. the average rate of change is decreasing
C. for all a, b in domain and α in [0,1], $f(\alpha a + (1-\alpha)b) \le \alpha f(a) + (1-\alpha) f(b)$
D. All of the above
E. None of the above

9. You invest $2 at 10% interest with continuous compounding. What is it worth after 40 years?

A. $45.26
B. $54.60
C. $90.52
D. $109.20
E. None of the above

10. What is the present value of $1000 in 5 years with 8% annual interest compounded yearly?

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

11. For 0 < a < b and x > 1, what can you say about $\log_a(x)$ and $\log_b(x)$?

A. $\log_a(x) < \log_b(x)$
B. $\log_a(x) > \log_b(x)$
C. The slope of $\log_a(x)$ is less than the slope of $\log_b(x)$
D. All of the above
E. None of the above

12. Your mutual fund increased in value from $10 to $27 over the last 10 years. What was the average annual return with continuous compounding for the mutual fund over the 10-year period?

A. 8%
B. 9%
C. 10%
D. 11%
E. None of the above

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

A. $-30\frac{\alpha \ln x}{\beta \ln y}$
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

14. How many years does it take for $10 to grow to $20 with 5% interest and continuous compounding?

A. 3.5
B. 6.9
C. 13.9
D. 27.7
E. None of the above

15. Consider the following system. Supply: Q = 2P – 2; Demand: Q = 10 – 2P. The equilibrium quantity and price are

A. (2, $2)
B. (4, $2)
C. (4, $6)
D. (6, $2)
E. None of the above

16. 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

17. Suppose the function f is strictly monotonic. Then

A. f must be strictly concave or strictly convex
B. f must be continuous
C. f must have an inverse f^{-1}
D. All of the above
E. None of the above

18. Suppose $f(x) = 1 - x^2$. Then

A. The derivative of f is decreasing in x
B. f is strictly concave
C. The average rate of change of f decreases in x
D. All of the above
E. None of the above

19. 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

20. The difference quotient of $y = x^3$ is

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

21. Total revenue = P·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

22. The derivative of f(x) is

A. The average rate of change as Δx approaches 0
B. $\lim_{\Delta x \to 0} \frac{f(x+\Delta x) - f(x)}{\Delta x}$
C. The slope of the tangent line at f(x)
D. All of the above
E. None of the above

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

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

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

A. $x = 1/12$
B. $x = 1/6$
C. $x = 1/3$
D. All of the above
E. None of the above

25. Let $y = 20 - 8x + x^3$. The differential of y is

A. $3x^2 - 8$
B. $-8 + 3x^2 + 3x\Delta x + \Delta x^2$
C. $(3x^2 - 8)dx$
D. $6x$
E. None of the above