Università Ca' Foscari di Venezia

Laurea Magistrale in Data Analytics for Business and Society

1 B00001

In the event of a liquidity trap, the LM curve:

A becomes a straight line parallel to the horizontal axis
B becomes a straight line parallel to the vertical axis
C is positively sloped
D is negatively sloped

2 B00002

In an IS-LM graph, an increase in the demand for money, with a constant money supply, results in:

A an increase in the interest rate and a decrease in production
B a decrease in the interest rate and an increase in production
C an increase in both the interest rate and production
D just an increase in the supply of goods

3 B00003

In the long run, with primary surpluses and a real GDP growth rate below the real interest rate, the debt-to-GDP ratio:

A can shrink
B cannot shrink
C is equal to 100%
D can only increase

4 B00004

All things being equal, a higher interest rate:

A reduces business investments
B increases business investment
C the number of profitable investment projects increases, comparing with the internal rate of return
D increases the internal rates of return on corporate investment projects

5 B00005

According to the theory of expectations, if the yield curve has a positive slope, the financial markets expect that:

A short-term interest rates rise in the future
B short-term interest rates fall in the future
C current interest rates are equal to the inflation rate
D short-term interest rates remain stable

6 B00006

Suppose the economic system is in a liquidity trap. If an expansionary monetary policy is implemented, it can be expected that the interest rate:

A does not change
B decreases
C increases
D in the short term always varies

B00007

7 **Which are the areas included in the SWOT analysis?**

A Opportunities, strengths, weaknesses and threats
B Threats, weaknesses, strategies and opportunities
C Strengths, weaknesses, options and threats
D Strengths, opportunities, technologies and weaknesses

B00008

8 **Consumer markets and business markets:**

A are very different from each other, from many points of view
B nowadays, they are different words for the B2B market
C differentiate from each other only if the final production is a product (consumer market) or a service (business market)
D generally share the same marketing difficulties and opportunities

B00009

9 **The four elements of marketing mix are:**

A product, price, promotion, place
B product, publicity, price, place
C price, partnership, promotion, publicity
D place, partnership, promotion, product

B00010

10 **The marketing strategy and initiatives are:**

A included in the marketing plan
B not included in the marketing plan
C included in the production plan
D not formalized in any document of the company due to privacy reason

B00011

11 **The process by which managers select and manage aspects of structure and culture so that an organization can control the activities necessary to achieve its goals is called:**

A organizational design
B organizational behaviour
C organizational environment
D organizational change

B00012

12 **Segmentation enables:**

A a specific marketing mix to be used for each client segment
B sales margins to be increased in the chosen segments
C new needs to be created in potential clients
D a marketing mix to be identified which can be applied to all clients

B00013

13 **A shift along the indifference curve:**

A leaves consumer satisfaction unchanged
B decreases consumer satisfaction
C increases consumer satisfaction
D represents a purchase of other assets

B00014

14 **On which of the following factors does the supply function NOT depend?**

A Consumer income
B Technological changes
C Price of the asset
D Cost of labor

B00015

15 **The presence of economies of scale:**

A is an important issue to consider in the industry entry strategy
B assesses the capability of the company in cost reduction
C is a company and not an industry item
D is less and less relevant due to increasing technology in industrial production

B00016

16 **A market of perfect competition reaches its long-run equilibrium when:**

A profits are zero
B costs are zero
C prices are maximum
D prices are equal to the minimum value of the total cost curve

B00017

17 **What curve shows how much capital a firm demands that equals the marginal product of capital at its price?**

A Capital demand curve
B Isocost of capital
C Capital expansion path
D Isoquant of capital

B00018

18 **The short-run supply curve of a firm in perfect competition coincides with:**

A the growing section of the marginal cost that lies above the average variable cost
B the entire marginal cost curve
C the entire average variable cost
D the growing section of the average variable cost

B00019

19 **What is a variation in production that allows for greater output to be obtained with the same input?**

A Technological progress
B Continuous production
C Elasticity of replacement
D Increasing returns to scale

B00020

20 **In the event that buyers continue to buy even when prices rise, we speak of the following type of demand:**

A rigid
B elastic
C fixed
D recessionary

B00021

21 **Let A be an n×n matrix and let det(A) be its determinant. Which of the following is FALSE?**

A If all elements on the main diagonal of A equal 0, then det(A) = 0
B If A is invertible, then det(A) ≠ 0
C If det(A) = 10, det(2A) = $10 \cdot 2^n$
D If we let B be an n×n matrix, then det(AB) = det(A) det(B)

B00022

22 **Find a linear approximation to $f(x) = x^3 + 4x$ at $x = -1$.**

A $y = 7x + 2$
B $y = 3x^2 + 4$
C $y = 7x - 1$
D $y = 3x + 4$

B00023

23 **The derivative of log[2 log(2x)] equals to:**

A 1/[x log(2x)]
B 1/[x log(x)]
C 1/[2 log(2x)]
D 1/log(2x)

B00024

24 **Let the derivative of f(x) be $f'(x) = x^2 - 4x^3$. On what intervals in R is f(x) monotonically increasing?**

A For $x \leq 1/4$
B For $0 \leq x \leq 1/4$
C For $x \leq 0$ and $x \geq 1/4$
D For $0 \leq x \leq 1/6$

B00025

25 Let $f(x) = \sqrt[3]{(x^2 - 3x)}$. How many points of non derivability does f(x) have on R?

A 2
B 0
C 1
D ∞

B00026

26 Find the partial derivatives of $f(x,y) = e^{(3x + 4y)}$ with respect to x and y.

A $\partial f/\partial x = 3e^{(3x + 4y)}$; $\partial f/\partial y = 4e^{(3x + 4y)}$
B $\partial f/\partial x = 3e^{x}$; $\partial f/\partial y = 4e^{y}$
C $\partial f/\partial x = 3e^{(3x)}$; $\partial f/\partial y = 4e^{(4y)}$
D $\partial f/\partial x = \partial f/\partial y = e^{(3x + 4y)}$

B00027

27 What is the hessian determinant of $(x + 3y)^2$?

A 0
B 36
C 8
D 20

B00028

28 The contour lines of $f(x,y) = x^2 + y^2 - 6y$, when they exist, are:

A circles of radius $\sqrt{(k + 9)}$
B circles of radius $\sqrt{(k - 9)}$
C ellipses of semi-major axis $\sqrt{(k + 9)}$ and semi-minor axis $\sqrt{(k - 9)}$
D hyperbolae of semi-major axis $\sqrt{(k^2 + 81)}$

IMAGE SS 07

$$\lim_{x \to 1} \left(\frac{ln\,(1+x)}{4x} \right)$$

B00029

29 Answer the following question concerning IMAGE SS 07

The limit shown in figure:

A is equal to 1/4
B does not exist
C is equal to $+\infty$
D is equal to $-\infty$

30 B00030

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

A is convex
B is concave
C is neither concave nor convex
D is locally convex in a subset of its domain, but is not globally convex

31 B00031

Let $f(x,y) = x^2 - 2y^2$. The origin O(0;0) is:

A a saddle point
B a global maximum
C a global minimum
D a local maximum

32 B00032

A firm produces two amounts q_A and q_B of two goods, A and B. The total cost is given by the function $f = (q_A)^2 + 2 q_A q_B + 2(q_B)^2$. The two goods are sold at prices $p_A = 30$ and $p_B = 50$, respectively. For what amounts q_A and q_B does the firm achieve its maximum profit?

A $q_A = 5$, $q_B = 10$
B $q_A = 50$, $q_B = 100$
C The profit function has no maximum
D $q_A = 100$, $q_B = 50$

33 B00033

Which of the following is the Lagrangian function associated to $f(x) = 2x^2 + y^2 - 3x + y$, with the constraint $x^2 + y^2 = 1$?

A $(2 + \lambda)x^2 + (1 + \lambda)y^2 - 3x + y - \lambda = 0$
B $(2 + \lambda)x^2 + (1 + \lambda)y^2 - 3x + y + \lambda = 0$
C $(2 + \lambda)x^2 + (1 + \lambda)y^2 - 3x + y = 0$
D $1 - 3x + y = 0$

34 B00034

If we multiply two matrices A and B, the rank of their product, i.e. r(AB), is always:

A less than or equal to r(A) and r(B)
B less than r(A) and r(B)
C greater than or equal to r(A) and r(B)
D greater than r(A) and r(B)

35 B00035

Let Ax = b be a system of n equations in n unknowns, where A is the coefficient matrix, x is the variable matrix, and b is the constant matrix. Let us represent the complete, or edged, matrix by Ab. If the system has infinite solutions, then:

A rank(A) = rank(Ab) < n
B rank(A) = rank(Ab) = n
C rank(A) < rank(Ab) < n
D rank(A) > rank(Ab)

36 B00036

If you toss a fair coin five times, what is the probability of getting at least four heads?

A 18.75%
B 15.625%
C 3.125%
D 7.03%

37 B00037

What is the approximating normal distribution of a Bernoullian distribution B(n = 30, p = 0.4)?

A N(μ = 12, σ² = 7.2)
B N(μ = 30, σ² = 0.16)
C N(μ = 12, σ² = 51.84)
D N(μ = 30, σ² = 51.84)

38 B00038

A pastry shop is visited by 20 customers hourly. In any two minutes, what is the probability of at least two customers showing up?

A 4.46%
B 3.98%
C 44.4%
D 11.1%

39 B00039

In a Gaussian distribution, the probability P {μ – 0.3σ < X < μ} is 11.79%. What is the probability that X < μ + 0.3σ?

A 61.79%
B 11.79%
C 23.58%
D 38.21%

40 B00040

Your favourite brand of crisps is running a promotion: one in each 5 bags of crisps will contain a small prize. You want to calculate the probability of getting at least one prize if you buy a certain amount of bags. What probability distribution should you apply to solve the problem?

A A binomial distribution
B A Poisson distribution
C A Bernoulli distribution
D A Gaussian distribution

41 B00041

A statistician calculates an estimate of the difference between two means coming from samples of two distinct populations, as well as its confidence interval at a given confidence level. Which of the following statements is correct?

A If the variance of both samples were double, other things being equal, the confidence interval would increase by a factor √2
B If the variance of both samples were double, other things being equal, the confidence interval would double
C If the variance of both samples were double, other things being equal, the confidence interval would increase by a factor 4
D If the variance of both samples were double, other things being equal, the confidence interval would shrink by a factor √2

B00042

42 **In hypothesis testing, the significance level α represents:**

A how much the sample value must be different from the null value before we can reject the null hypothesis
B the probability of the sample value being equal to the population value
C how much the sample value must be different from the null value in order to fully prove the null hypothesis
D the deviation of the sample value from the null value

B00043

43 **In hypothesis testing, a Type II Error means that:**

A we didn't reject the null hypothesis and it is false
B we rejected the null hypothesis and it is true
C we didn't reject the null hypothesis, and it is actually true
D we rejected the null hypothesis and it is false

B00044

44 **An algorithm is developed in order to estimate whether a firm asking for a loan is likely to default before repaying its debt. In the previous years, 3% of firms in the market have defaulted before repaying their debt. When trained on those historical data, the algorithm correctly rejects 97% of applications from those firms which have actually defaulted, but it also rejects 5% of applications from firms which have subsequently managed to fully repay their debt. If a firm's application is rejected by the algorithm, what is the probability that it actually defaulted?**

A 37.5%
B 7.8%
C 5.3%
D 2.9%

B00045

45 **An investor is interested in calculating covariance between two stocks, because he does not want to own stocks that tend to move in the same direction. The prices of Stock 1 over four consecutive years are 64.8, 65.1, 59.1 and 64.9; over the same years, the prices of Stock 2 are 4.95, 5.10, 4.92 and 5.08. What is the covariance of the two sets of data?**

A 0.147
B 0.589
C 0.212
D 0.192

B00046

46 **A fair coin is tossed 5 times. The probability of getting exactly 3 heads is:**

A 5/16
B 3/5
C 2/3
D 1/32

B00047

47 **Let A and E be two independent random events. If p(A) = 70% and p(E) = 40%, the probability p(A ∩ Ē) equals:**

A 42%
B 70%
C 12%
D 88%

B00048

48 **Let X and Y be two independent random variables. The variance of their difference equals:**

A Var(X) + Var(Y)

B Var(X) – Var(Y)

C 0

D Var(X) · Var(Y)

B00049

49 **Over the course of five years, the production output of a company sees an annual growth of +12%, +6%, +2%, +12% and +1%. What is the most appropriate measure of the average yearly growth rate?**

A The geometric mean (approximately +4.4%)

B The median (+6%)

C The arithmetic mean (+6.6%)

D The mode (+12%)

B00050

50 **Which of the following statements about the correlation coefficient of two variables is FALSE?**

A The smaller the correlation coefficient, the weaker the correlation between the two variables

B If the correlation coefficient is close to zero, the two variables have a weak correlation with each other

C A correlation coefficient of 1 means a perfect positive correlation

D The minimum value for the correlation coefficient is –1