Università Ca' Foscari Venezia
Laurea in Economia aziendale (curriculum Economics and management);
Laurea in Economia e Commercio (curriculum Economics, markets and finance)

Università degli studi di Trieste
Laurea in Economia e gestione aziendale - Business Administration and
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Laurea in Economia, Commercio internazionale e Mercati finanziari -
International Economics and Financial Markets (curriculum Economics and
Financial Markets)

QUESTIONNAIRE

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PROVA P00000

1. **"Some musicians are singers; all the singers are artists". Which of the following is a valid conclusion?**
   1. Some musicians are artists.
   2. All singers are musicians.

●A. 1

B. 2

C. Both

D. Neither

2. **Provide a formula for the general term of the following sequence: 23, 45, 89, 177, ...**

A. $2n$

B. $n^2 - 1$

●C. $2n - 1$

D. $2n + 1$

3. **A taxi driver charges a call out rate and a rate per kilometre for taxi rides. For a 4 kilometres ride he charges 11 €, and for a 5 kilometres ride 13 €. How much does he charge for a 9 kilometres ride?**

A. 15 €

●B. 21 €

C. 17 €

D. 19 €

4. **Pain nerve impulses are twice as fast as normal touch impulses. If John touches a boiling hot pan this message reaches his brain, 1 metre away, in 1 millisecond. What is the speed of a normal touch impulse?**

A. 200 m/s

●B. 500 m/s

C. 5 m/s

D. 50 m/s

5. **A woman chooses her children's names beginning with the same letter as the month they were born: Maria and Jack have birthdays 3 months apart; Amber is born 2 months after James's birthday. How many months after Amber's birth is Maria's next birthday?**

A. 2 months

B. 4 months

C. 5 months

●D. 7 months

6. **According to the figure below, indicate the diagram that represents the relations between the intervals:**
   $31 \leq x \leq 35; \quad 25 \leq x \leq 45; \quad 30 \leq x \leq 40$
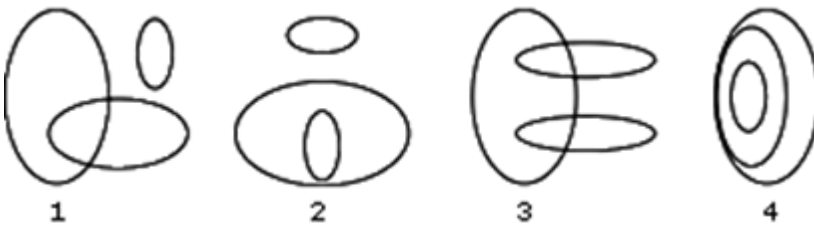
●A. 4

B. 2

C. 1

D. 3

7. **When rolling a fair dice, what is the probability of getting a number which is odd or strictly greater than 4?**

A. $\frac{5}{6}$

B. $\frac{1}{2}$

C. $\frac{1}{4}$

●D. $\frac{2}{3}$

8. **There are 100 balls in a bag. 25 are blue, 15 are red and 60 are yellow. What is the probability of getting a red ball?**
A. 25%
B. 20%
C. $\frac{20}{3}$
•D. $\frac{3}{20}$

9. **Calculate the mean of the following numbers: 0, 15, −3, 18, 200.**
•A. 46
B. 57.5
C. 100
D. 0

10. **Write the following term of the sequence: 5, 7, 14, 16, 32, 34, ...**
•A. 68
B. 64
C. 36
D. 92

11. **All products in a store were marked up by 10%. They were subsequently in a sale with quoted saving of 20% from the augmented price. What is the true reduction from the original price?**
A. 28%
B. 15%
•C. 12%
D. 25%

12. **Green Sun cleaners buy industrial bleach from a warehouse and dilute it before using it domestically. The dilution (water:bleach) is by 9:1. If the cleaners require 10 litres of diluted bleach, how much warehouse bleach do they require?**
A. 90 ml
B. 900 ml
•C. 1000 ml
D. 100 ml

13. **A team of 4 builders take 12 days of 7 hours work to complete a house. The company decides to recruit 3 extra builders. How many 8 hour days will it take the new workforce to build a house?**
A. 2 days
•B. 6 days
C. 7 days
D. 10 days

14. **Complete the following conditional argument: "If Carl stops training he will not improve his results; ..."**
A. Carl does not stop training, so he improves his results
•B. Carl improves his results, so he did not stop training
C. Carl does not improve his results, so he did stop training
D. All the other answers are wrong

15. **Select the pair of numbers that has 18 as their greatest common divisor:**
A. 36 and 84
•B. 90 and 72
C. 36 and 96
D. 80 and 90

16. **Mary and Jack are running around a circular building. They started at the same time and point. Mary takes 8 minutes to complete a full round and Jack 15 minutes. They will meet again at the starting point after:**
•A. 2 hours
B. 1 hours
C. 3 hours
D. 2 hours 30 min.

17. **Natalie plants a tree with a height of 40 cm. The information leaflet states that the plant should grow by 20% the first year, and then 10% each year thereafter. What is the expected height at 2 years?**
A. 53.0 cm
B. 53.8 cm
•C. 52.8 cm
D. 52.0 cm

18. **The Simpsons have 3 children whose total age is 18. Paul is double the age of Jeremy. Annie is exactly half way between the ages of Jeremy and Paul. How old are each of the children?**

A. Paul 8, Jeremy 6, Annie 4

B. Paul 6, Jeremy 6, Annie 6

●C. Paul 8, Jeremy 4, Annie 6

D. Paul 8, Jeremy 3, Annie 7

19. **In a sequence of numbers, we add 9 to each term to get the next one.**
    If the sequence starts with 2, what is the 81st term?

A. 632

B. 695

C. 713

●D. 722

20. **The statement form $\neg(p \wedge q) \Leftrightarrow (\neg p \vee \neg q)$ is equivalent to:**

●A. $(\neg p \vee \neg q) \Leftrightarrow \neg(p \wedge q)$

B. $\neg(p \vee q) \Leftrightarrow (\neg p \vee \neg q)$

C. $\neg(p \wedge q) \Leftrightarrow (\neg p \wedge \neg q)$

D. all the other answers are wrong

21. **Solve the system of equations**
$$\begin{cases} 4x + 3y = 7 \\ 2x + 8y = 12 \end{cases}$$

A. $(x,y) = \left(\dfrac{17}{13}, \dfrac{10}{13} \right)$

●B. $(x,y) = \left(\dfrac{10}{13}, \dfrac{17}{13} \right)$

C. $(x,y) = (1,2)$

D. $(x,y) = (2,1)$

22. **Simplify**
$$3x \left(\frac{3x^7}{x^{\frac{1}{3}}} \right)^3$$

A. $8x^{\frac{23}{3}}$

B. $9x^{20}$

C. $9x^{10}$

●D. $81x^{21}$

23. **Solve $x^2 + 3x - 5 = 0$**

A. $x = -\dfrac{3}{2} \pm \dfrac{\sqrt{11}}{2}$

B. $x = \dfrac{3}{2} \pm \dfrac{\sqrt{11}}{2}$

C. $x = -\dfrac{3}{2} \pm \dfrac{\sqrt{11}}{4}$

●D. $x = -\dfrac{3}{2} \pm \dfrac{\sqrt{29}}{2}$

24. **How many times do the curves of equations $y = x^3$ and $y = x^2 - x$ intersect?**

A. 0

●B. 1

C. 2

D. 3

25. **Which of the following curves have graphs that do not intersect?**
    1. $y = x$ 2. $y = x^2$ 3. $y = 1 - x^2$ 4. $y = 2$

A. 1 and 2

B. 2 and 3

●C. 3 and 4

D. 1 and 3

26. **The inequality $x + y \leq 3$ defines a region in the plane. Which of the following points belongs to the region?**

A. (2, 2)

B. (3, 1)

•C. (1, 2)

D. (3, 5)

27. **if**

$$\sqrt{1 + 3x} = y^5 + 1$$

then:

•A. $x = \dfrac{(y^{10} + 2y^5)}{3}$

B. $x = \dfrac{3}{(y^{10} + 2y^5)}$

C. $x = (y^{10} + 2y^5)$

D. $x = 3(y^{10} + 2y^5)$

28. **Factorise $3a^3 - 30a^2 + 75a$.**

A. $3(a - 3)^3$

B. $a(3a - 5)^2$

C. $3a(1 - a)^2$

•D. $3a(a - 5)^2$

29. **When 5 is subtracted from $5x$ the result is half the sum of 2 and $6x$. What is the value of x?**

A. 0

B. 1

C. 2

•D. 3

30. **Solve the inequality $x^2 \geq 6 - x$.**

A. $x \leq -3$ and $x \leq 2$

•B. $x \leq -3$ or $x \geq 2$

C. $x \geq -3$ and $x \leq 2$

D. $x \geq -3$ or $x \geq 2$

31. **Consider the graphs $y = x^2 - 2x + 3$ and $y = x^2 - 6x$. Which of the following is true?**

A. Both equations intersect the x-axis

B. Neither equations intersects the x-axis

•C. The first equation does not intersect the x-axis; the second equation intersects the x-axis

D. The first equation intersects the x-axis; the second equation does not intersect the x-axis

32. **Mr. House derives a formula:**

$$Q = \frac{(x+y)^2 a}{3b}.$$

He doubles the values of x and y, halves the value of a and triples the value of b. What happens to value of Q?

A. It becomes 1/3 of the former value

•B. It becomes 2/3 of the former value

C. It decreases by 2/3

D. It remains unchanged

33. **A function is defined by the following formula:**

$$f(x) = \frac{x^2}{4} - 11.$$

Where in the domain does $f(x)$ reach the value 14 ?

A. -4

•B. ± 10

C. $\pm\sqrt{12}$

D. 100

34. Which of the statements best describes the solution set for the following system of inequalities?

$$\begin{cases} y \le \frac{2}{3}x + 1 \\ 2x - 3y \le 12 \end{cases}$$

A. The system has no solution

B. The solution set consists of a single point

C. The solution set consists of all real numbers

•D. The solution set consists of all points that lie between two boundary lines

35. if $A = (-\infty, -10]$, $B = [1/2, 1)$ and $C = [1,2]$ then it is true that:

A. $A \cup B \cup C = \varnothing$

•B. $A \cap B \cap C = \varnothing$

C. $B \cap C = \{1\}$

D. All the other answers are wrong

36. The Cartesian product of $A = \{1,2\}$ and $B = \{x,y\}$ is:

A. $\{(1,x),(1,y),(2,x),(y,y)\}$

B. $\{(1,1),(2,2),(x,x),(y,y)\}$

•C. $\{(1,x),(2,x),(1,y),(2,y)\}$

D. $\{(1,1),(x,x),(2,x),(1,y)\}$

37. If $A = \{d, e, f\}$, $B = \{a, b, c, d, e, f\}$ and $C = \{a, b, c\}$; which of the following statement is false?

A. $A - B = \varnothing$

B. $B - A = \{a, b, c\}$

C. $C - B = \varnothing$

•D. $B - C = \{e, f\}$

38. Which of the following represents the solution set of $11(3x + 1) > 11$?

A. $[0, \infty)$

•B. $(0, \infty)$

C. $[1/33, \infty)$

D. $(1/33, \infty)$

39. How many real solutions does the equation $(x^2 + 2)(x^2 - 4)(x - 5) = 0$ have?

A. 1

•B. 3

C. 2

D. 5

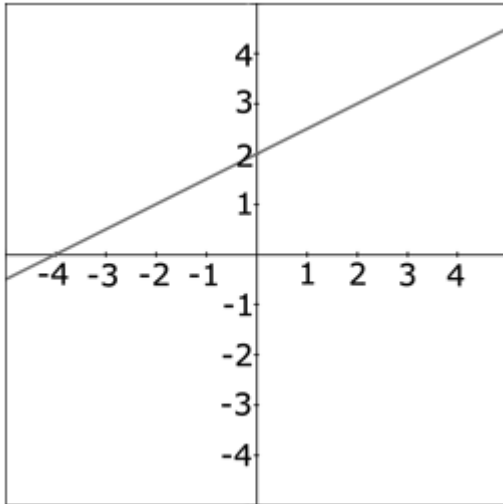**40.** What value of x satisfies the equation below?

$$\frac{4x}{x-7} + \frac{2x}{2x-14} = \frac{70}{2(x-7)}$$

A. 0

B. 7

•C. No solution

D. Any value such that $x \ne 7$

41. If $p = 4x^3 + x - 2$, $q = x^2 - 1$ and $r = 3x - 5$, then what is $2p - (q + r)$?

A. $7x^3 - x + 2$

•B. $8x^3 - x^2 - x + 2$

C. $8x^3 - x^2 - x - 10$

D. $8x^3 - x^2 + 5x - 8$

42. **Match the following graph with the correct equation:**
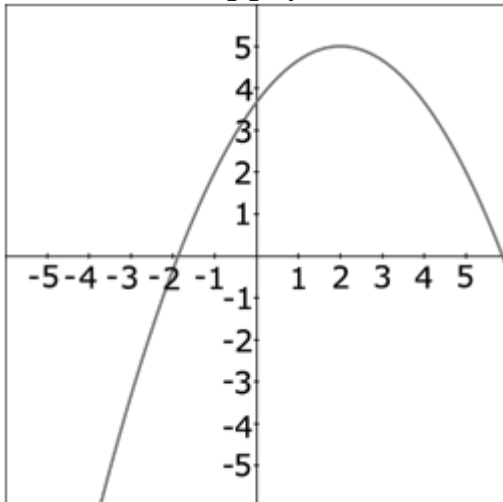

- •A. $y = \frac{1}{2}x + 2$

- B. $y = \frac{3}{2}x - 2$

- C. $y = \frac{1}{2}x - 2$

- D. $y = \frac{3}{2}x + 2$

43. **Match the following graph with the correct equation:**

- •A. $y = -\frac{1}{3}(x - 2)^2 + 5$

- B. $y = -\frac{1}{3}(x + 2)^2 + 5$

- C. $y = \frac{1}{3}(x + 2)^2 + 5$

- D. $y = 3(x - 2)^2 + 5$

44. **The domain of**
$$f(x) = \sqrt{5x - 11}$$
is:

- •A. $\left[\frac{11}{5}, +\infty\right)$

- B. $\left[\frac{5}{11}, +\infty\right)$

- C. $\left(\frac{11}{5}, +\infty\right)$

- D. $\left[-\frac{5}{11}, +\infty\right)$

45. **A line segment with endpoints (−2,8) and (−7,−5) has a length of:**

•**A.** $\sqrt{194}$

B. 13

C. 14

D. 5