

**A. Partea I: CITIT**  
(Citirea cu atenție)

Choose the correct answer a, b, c, or d.

Ford Motor Company is an American automaker and the world's third largest automaker based on worldwide vehicle sales. Based in Dearborn, Michigan, a suburb of Detroit, the automaker was founded by Henry Ford, and incorporated on June 16, 1903. Ford Motor Company would go on to become one of the largest and most profitable companies in the world, as well as being one of the few to survive the Great Depression.

The largest family-controlled company in the world, the Ford Motor Company has been in continuous family control for over 110 years. Ford now encompasses two brands: Ford and Lincoln. Ford once owned 5 other luxury brands, they were Volvo, Land Rover, Jaguar, Aston Martin and Mercury. But over time those brands were sold to other companies and Mercury was discontinued.

1. According to the passage ...

a	Ford founder lives in Michigan.
b	Ford producer is the third in global vehicle trader.
c	Henry Ford lives in a suburb of Detroit.
d	Few automakers continued to exist after The Great Depression.

2. We learn from the text that Ford company is ...

a	the largest worldwide family business for more than 110 years.
b	in business for less than 110 years.
c	the trademark of 5 other deluxe brands.
d	in control of seven brands.

Although Finland did not achieve full national independence until 1917, its current military traditions go back more than 300 years. As an integrated part of the kingdom of Sweden, Finland supplied the Swedish armies not only with foot soldiers, but also with highly qualified officers. Contributing as much as one-third of the manpower of the Swedish armed forces, the Finnish infantry and cavalry distinguished themselves at a time when Sweden was playing a decisive role in European power politics.

The performance of the Finns on various battlefields had justified their reputation for bravery and their confidence in their own martial abilities. With the decline of Swedish power in the eighteenth century, the Finns were requested to defend the country's borders to the east against their enemy, Russia. On three major occasions, Russian armies occupied parts of the country for a number of years before eventually being driven out by Finnish and Swedish forces.

3. The passage informs us that...

a	Finland current military independence goes back more than 300 years.
b	Finland became independent before 1917.
c	Finnish military traditions are more than 300 years old.
d	Finnish national traditions were not achieved earlier than 1917.

4. According to the text, Finland supported Sweden...

a	with personnel and forces.
b	to integrate in Europe.
c	to achieve full national independence.
d	with soldiers and officers.

5. The Finns were known ...

a	to have declined the Swedish power.
b	to have defended Russia.
c	for courage and trust in their own military skills.
d	for their doubt and lack of determination.

(Citirea selectivă)

The Glock pistol is a series of semi-automatic pistols designed and produced by Glock Ges.m.b.H. located in Deutch – Wagram, Austria. The company's founder, engineer Gaston Glock, had no experience with firearm design or manufacture at the time their first pistol, the Glock 17, was being prototyped. In 1980, the Austrian military announced that it would seek a new, modern duty pistol to replace their Walther P38 handguns. It was adopted into service with the Austrian military and police forces in 1982 as the P80.

The Glock 17 outperformed 8 different pistols from five other established manufacturers. In late 1983, the United States Department of Defense inquired about the Glock pistol and received four samples of the Glock 17 for unofficial evaluation. Glock was then invited to participate in Personal Defense Pistol Trials, but declined. Shortly thereafter, the Glock 17 was accepted into service with the Norwegian and Swedish Armed Forces, surpassing all NATO durability standards. Thus, it became a standard NATO-classified sidearm.

6. Glock 17 is...

a	a prototype weapon.
b	a semi-automatic firearm.
c	an inoffensive pistol.
d	a sample handgun.

7. The Walther P38 guns were replaced ...

a	with prototype guns.
b	in 1980.
c	in 1983.
d	with P80 guns.

8. Glock 17 was assessed by U.S. Department of Defense ...

a	by the end of 1983.
b	later than 1983.
c	to please manufacturers.
d	to improve NATO standards.

The history of the tank began in World War I, when armoured all-terrain fighting vehicles were first deployed as a response to the problems of trench warfare. During World War I a first offensive using Mark I tanks took place on 15 September 1916, in the Battle of the Somme. Out of many more committed, only 32 were mechanically fit to take part in the advance and achieved some small, local successes. In July 1917, 216 British tanks were employed in the Third Battle of Ypres but found it almost impossible to operate in the muddy conditions. Not until 20 November 1917, at Cambrai, did the British Tank Corps get the conditions needed for success. Over 400 tanks penetrated almost six miles on a 7-mile front. The infantry failed to exploit and secure the tanks' gains and the territory gained was recaptured by the Germans. The British scored a more significant victory on 8 August 1918, with 600 tanks in the Battle of Amiens.

9. The first tank attack dates back to ...

a	1916.
b	1917.
c	20 November 1917.
d	July 1917.

10. A number of ... tanks were employed in the Battle of Somme.

a	600
b	216
c	32
d	400

11. The British Tank Corps gained their first success in ...

a	the Battle of Ypres.
b	the Battle of Amiens.
c	the Battle of Somme.
d	the Battle of Cambrai.

12. Due to infantry mistakes, the enemy ... the gained territory.

a	secured
b	recaptured
c	used
d	attacked

Victoria's Secret is the largest American retailer of lingerie founded by Roy Raymond and his wife Gaye in San Francisco on June 12, 1977. The company sells lingerie, woman's wear and beauty products through its 1,000 U.S. stores, catalogues (annually mailing out 372 million) and website. Raymond studied the lingerie market for eight years before borrowing \$40,000 from his parents and \$40,000 from a bank to establish Victoria's Secret: a store man could feel comfortable buying lingerie.

The company's first store was located in Stanford Shopping Center in Palo Alto, California. Prior to founding Victoria's Secret, Raymond had been embarrassed when purchasing lingerie for his wife at a department store. During the 1970s and 1980s most women in America purchased "pragmatic", "foundation garments" by Fruit of the Loom, Hanes and Jockey in packs of three from department stores and saved "fancier items" for "special occasions" like honeymoons. "Lacy thongs and padded push-ups bras" were niche products during this period.

13. Victoria's Secret represents ...

a	the largest American lingerie seller.
b	the biggest American foundation.
c	the greatest American company.
d	an American lingerie collection.

14. The company sells its products by means of ...

a	door-to-door.
b	banks.
c	stores, catalogues and websites.
d	lingerie market.

15. When buying lingerie for his wife, Raymond felt ...

a	pragmatic.
b	shy.
c	fancier.
d	special.

**Partea a II-a: ELEMENTE DE GRAMATICĂ ȘI VOCABULAR**  
(Gramatică)

Choose the correct answer a, b, c, or d.

16. The receptionist at the front desk gave me two ... .

a	lots of information.
b	informations.
c	information.
d	pieces of information.

17. I caught the wrong train by...

a	defect.
b	mistake.
c	weakness.
d	lack.

18. The chocolate looks...than the candy.

a	worse.
b	worser.
c	bad.
d	badder.

19. I recall that when Jane was young she...play tennis very well.

a	can
b	must
c	could
d	shall

20. You shouldn't drive so fast. It's too...

a	unfamiliar
b	lucky
c	friendly
d	risky

21. The market stalls sell a range of vegetables...they're not always as fresh as they should be.

a	while
b	because
c	even though
d	in case

22. I know someone who wrote a book about...life of Ghandi.

a	an
b	the
c	a
d	one

23. If I...her phone number, I would call her.

a	would have known
b	had known
c	would know
d	knew

24. I knew that she...Madrid before, so I asked her to recommend a good hotel.

a	had visited
b	has been visiting
c	visited
d	has visited

25. The bus...late, she had to wait patiently.

a	having
b	was
c	being
d	has been

*(Vocabulary)*

26. People always tend to...a fortune when they go on holiday.

a	make
b	spend
c	get
d	seek

27. I am...of my behaviour last night and I am writing to apologize.

a	ill
b	serious
c	reasonable
d	ashamed

28. I am just not very good...singing.

a	at
b	in
c	by
d	on

29. I always start to feel nervous when I...the bus.

a	get by
b	get off
c	get on with
d	get over

30. Did you remember to set the...just before you left home? I'm worried by the amount of crime in the area.

a	burglar alarm
b	alarm clock
c	alert player
d	watch

31. Julietta wants to relocate to the centre of the town because it's unexciting living...

a	out the skirts
b	on the skirts
c	on the outskirts
d	in outskirts

32. You need to be a... . The course is very demanding.

a	slow learner
b	fast learner
c	fastest learner
d	slowest learner

33. That film has a fantastic...I just loved the music!

a	subject
b	plot
c	performance
d	soundtrack

34. Don't take what he said so seriously. He was only...

a	enjoying
b	joking
c	amusing
d	boring

35. I'm going to spend a few days with some...of mine, who live abroad.

a	relatives
b	ancestors
c	families
d	companies

### B. Partea a III-a: SCRIS

36. Choose the most appropriate answer to formulate an informal request:

a	Betty, would you help me with this grammar exercise, please?
b	Betty, wouldn't you help me with this grammar exercise, please?
c	Betty, can you help me with this grammar exercise, please?
d	Betty, do you mind helping me with this grammar exercise, please?

37. Which is the most appropriate sentence to make a complaint?

a	I 'm afraid but this child is too noisy!
b	This child is too noisy!
c	I'm so sad that this child is so noisy!
d	I'm afraid I've got a complaint about your child. He's too noisy!

38. Choose the most appropriate line to begin a formal letter:

a	Dear Sir/Madam,
b	Mrs. Johnson,
c	Madame,
d	Dear lady,

39. Choose the most appropriate line to make an informal invitation:

a	Would you care to join me for a party tonight?
b	Would you like to join me to the party tonight?
c	Let's go to the party tonight!
d	There's a party tonight, would you be so kind to join me?

40. Choose the most appropriate line to accept a formal invitation:

a	Thank you! Can't wait to see you!
b	Thanks for the invitation! I'll be there!
c	Thanks for the invitation. I'm so upset I cannot come, but I've already made plans.
d	Thank you for inviting me! It will be my pleasure to attend.

41. Which is the most logical statement?

a	She had take her brother along with her.
b	She had to take her brother along with her.
c	She is having to take her brother along with her.
d	She isn't having to take her brother with her.

42. Which is the correct address?

a	5024, Broadway Ave., WEST BEACH, AUSTRALIA
b	5024, Broadway Ave., AUSTRALIA, WEST BEACH
c	Broadway Ave., WEST BEACH, AUSTRALIA, 5024
d	5024, WEST BEACH, Broadway Ave., AUSTRALIA

43. Which is the correct narration?

a	It was Tuesday evening and I was getting ready to go to bed when the telephone was ringing.
b	It was Tuesday evening and I had got ready to go to bed when the telephone rang.
c	It had been Tuesday evening and I was getting ready to go to bed when the telephone rang.
d	It was Tuesday evening and I was getting ready to go to bed when the telephone rang.

44. Which is the correct sentence?

a	Neither my mother or my father will be able to attend the party on Sunday.
b	Neither my mother nor my father will be able to attend the party on Sunday.
c	Neither my mother but not my father will be able to attend the party on Sunday.
d	Neither my mother and my father will be able to attend the party on Sunday.

45. Which is the most logical sentence?

a	They will have asked the president saying something about the critical situation.
b	They will ask the president says something about the critical situation.
c	They will ask the president to say something about the critical situation.
d	They will ask the president to have said something about the critical situation.

**BAREM DE EVALUARE ȘI APRECIERE A  
TESTULUI GRILĂ LA ENGLEZĂ  
VARIANTA I**

1	b	16	d	31	c
2	a	17	b	32	b
3	c	18	a	33	d
4	d	19	c	34	b
5	c	20	d	35	a
6	b	21	c	36	c
7	d	22	b	37	d
8	a	23	d	38	a
9	a	24	a	39	c
10	c	25	c	40	d
11	d	26	b	41	b
12	b	27	d	42	a
13	a	28	a	43	d
14	c	29	b	44	b
15	b	30	a	45	c

**LUCRARE SCRISĂ LA PSIHLOGIE**  
**VARIANTA I**

*Notă. Cele 30 de întrebări tip grilă pot avea unul, mai multe sau toate răspunsurile corecte.*

1. Identificați procesele cognitive senzoriale: a. senzația; b. atenția; c. percepția; d. reprezentarea.
2. Stimularea receptorilor din piele declanșează: a. senzații organice; b. senzații tactile; c. senzații chinestezice.
3. Spiritul de observație reprezintă: a. o metodă de investigare; b. o atitudine; c. o aptitudine.
4. Care este contrastul senzorial cel mai ușor de identificat? a. negru pe galben; b. roșu pe portocaliu; c. verde pe albastru.
5. Zgomotul produs de decolarea unui avion determină: a. apariția senzațiilor olfactive; b. diminuarea sensibilității bastonașelor cu 20%; c. creșterea sensibilității bastonașelor peste valoarea mediei.
6. Orice proces perceptiv presupune: a. interpretare; b. detecție; c. discriminare; d. identificare.
7. Reprezentarea unui motor cu ardere internă redă structura lui datorită: a. imaginii panoramice dată de reprezentare; b. senzațiilor redade de reprezentare.
8. Teoria stadială a dezvoltării inteligenței a fost elaborată de: a. H.Gardner; b. A.Maslow; c. J. Piaget.
9. După durata păstrării, memoria este: a. senzorială; b. de scurtă durată; c. de lungă durată.
10. Ca proprietate a tuturor sistemelor biologice vii, memoria este un proces de: a. întipărire; b. stocare; c. manipulare; d. reactualizare.
11. Coloana infinitului și Masa tăcerii, creațiile celebre ale lui C. Brâncuși, ilustrează unul dintre procedeele combinărilor imaginative: a. omisiunea; b. multiplicarea.
12. Brainstorming-ul este o: a. tehnică de creativitate colectivă; b. metodă de anihilare a ideilor noi; c. furtună de idei.

13. Forma cea mai evoluată a limbajului este: a. limbajul intern; b. limbajul scris; c. limbajul oral.
14. Notele definatorii ale atenției sunt: a. orientarea; b. selectivitatea; c. concentrarea.
15. Demnitatea face parte din categoria sentimentelor: a. intelectuale; b. estetice; c. psihosociale.
16. Care dintre următorii termeni desemnează exclusiv natura umană: a. individualitate; b. persoană; c. individ; d. personalitate.
17. Trebuința apare atunci când: a. persoana știe ce vrea; b. se produce un dezechilibru ce se cere imperios refăcut.
18. Ce fel de motivație este în plăcerea de a ne plimba, de a citi o carte care ne interesează? a. motivație extrinsecă; b. motivație intrinsecă.
19. Activitatea voluntară se caracterizează prin: a. depășirea obstacolelor; b. autoreglarea vieții psihice.
20. Voința, ca formă de autoreglare a conduitei, este: a. conștientă; b. inconștientă.
21. Portretul psiho-moral al individului este reflectat de: a. temperament; b. caracter; c. aptitudini.
22. Faptul că relațiile interpersonale pot fi evaluate moral reflectă caracterul lor: a. etic; b. formativ; c. direct.
23. Prezentarea de argumente pro și contra într-o dezbatere reflectă una dintre funcțiile limbajului numită: a. funcția de reglare; b. funcția expresivă; c. funcția dialectică.
24. Formarea unei imagini corecte despre celălalt este determinată de: a. capacitatea persoanei, cu care intrăm în relație, de a se exterioriza; b. capacitatea de a aprecia comportamentele altora.
25. Statusul social definește: a. drepturile persoanei; b. îndatoririle persoanei.
26. Familia face parte din categoria: a. grupurilor primare; b. grupurilor secundare.
27. „Criza de originalitate” se manifestă în: a. copilărie; b. pubertate; c. adolescență.

28. Mediul, ca factor fundamental al dezvoltării personalității, funcționează ca: a. premisă; b. sursă și condiție.
29. Fenomenul de reminiscență este specific: a. bătrâneții; b. maturității; c. tinereții.
30. Fazele procesului creativ sunt: a. formularea intenției și împărtășirea ei; b. documentarea și experimentarea; c. gestația; d. iluminarea – apariția soluției; e. elaborarea finală a soluției.

**BAREM DE EVALUARE ȘI APRECIERE A  
TESTULUI GRILĂ LA PSIHOLOGIE  
VARIANTA I**

1	a, c, d	16	b, d
2	b	17	b
3	c	18	b
4	a	19	a, b
5	b, c	20	a
6	a, b, c, d	21	b
7	a	22	a
8	c	23	c
9	b, c	24	a, b
10	a, b, d	25	a, b
11	b	26	a
12	a, c	27	c
13	a	28	b
14	a, b, c	29	a
15	c	30	b, c, d, e

LUCRARE SCRISĂ LA MATEMATICĂ  
VARIANTA I

1. Fie ecuația  $mx^2 + 3x - 1 - m = 0$ ,  $m \in \mathbb{R}^*$ , unde  $x_1, x_2$  sunt soluțiile ecuației. Atunci valoarea expresiei  $3x_1x_2 - x_1 - x_2$  este:  
**a)**  $-3$ ; **b)**  $\ln 2$ ; **c)**  $\sqrt{3}$ ; **d)**  $-\pi$ ; **e)**  $e$ .
2. Fie  $(a_n)_{n \geq 1}$  o progresie aritmetică de rație  $r$ . Știind că  $a_1 = 3$  și  $a_{27} = 81$ , atunci  $r$  este:  
**a)**  $3$ ; **b)**  $0$ ; **c)**  $-4$ ; **d)**  $4$ ; **e)**  $-1$ .
3. Se consideră binomul  $(\sqrt[3]{x} - x\sqrt{x})^{11}$ . Coeficientul termenului din dezvoltare care-l conține pe  $x^6$  este:  
**a)**  $55$ ; **b)**  $50$ ; **c)**  $45$ ; **d)**  $35$ ; **e)**  $30$ .
4. Dacă ecuația  $x^3 - 5x^2 + 7x + 13 = 0$  are rădăcina  $x_1 = 3 + 2i$ , unde  $i^2 = -1$ , atunci  $x_2 \cdot x_3$  este:  
**a)**  $-3 + 2i$ ; **b)**  $-3 - 2i$ ; **c)**  $-1 + 2i$ ; **d)**  $1 + 2i$ ; **e)**  $2i$ .
5. Valoarea reală a lui  $m$  pentru care sistemul 
$$\begin{cases} mx + y - 2z = 2 \\ 2x + y + 3z = 1 \\ (2m - 1)x + 2y + z = 2 \end{cases}$$
 este incompatibil, este:  
**a)**  $m = 3$ ; **b)**  $m = 2 \ln 3$ ; **c)**  $m = 9\sqrt{2}$ ; **d)**  $m = 5e$ ; **e)**  $m = 7\pi$ .
6. Dacă  $\cos \alpha = -\frac{3}{5}$  și  $\alpha \in \left(\pi, \frac{3\pi}{2}\right)$ , atunci  $\operatorname{tg} \alpha$  are valoarea:  
**a)**  $\frac{4}{3}$ ; **b)**  $-\frac{4}{3}$ ; **c)**  $\frac{1}{3}$ ; **d)**  $-\frac{1}{3}$ ; **e)**  $\frac{5}{3}$ .
7. Unghiul format de vectorii  $\vec{u} = 2\vec{i} - 5\vec{j}$  și  $\vec{v} = 5\vec{i} + 2\vec{j}$ , este:  
**a)**  $\frac{\pi}{2}$ ; **b)**  $\frac{\pi}{4}$ ; **c)**  $\frac{\pi}{3}$ ; **d)**  $\frac{\pi}{6}$ ; **e)**  $\frac{2\pi}{3}$ .
8. Parametrul  $\lambda \in \mathbb{R}$ , pentru care familia de drepte  $x - y + 1 + \lambda(2x - y) = 0$ , este paralelă cu  $Ox$ , are valoarea:  
**a)**  $-\frac{1}{2}$ ; **b)**  $\frac{1}{2}$ ; **c)**  $-\frac{3}{2}$ ; **d)**  $0$ ; **e)**  $1$ .
9. Dacă  $z^2 + z + 1 = 0$ , atunci valoarea expresiei  $z^{2013} + \frac{1}{z^{2013}}$ , este:  
**a)**  $2$ ; **b)**  $-2$ ; **c)**  $1$ ; **d)**  $4$ ; **e)**  $i$ .
10. Fie punctele  $A(-2;0)$ ,  $B(4;0)$  și  $C(0;6)$ . Distanța de la punctul  $B$  la dreapta  $(AC)$  este:  
**a)**  $\frac{9\sqrt{10}}{5}$ ; **b)**  $\frac{3\sqrt{10}}{5}$ ; **c)**  $\frac{9\sqrt{10}}{7}$ ; **d)**  $\sqrt{10}$ ; **e)**  $9\sqrt{10}$ .
11. Fie funcția  $f: \mathbb{R} - \{2\} \rightarrow \mathbb{R}$ ,  $f(x) = \begin{cases} \frac{a \ln(3-x)}{x-2}, & x < 2 \\ \frac{2^x - 4}{x-2}, & x > 2 \end{cases}$ . Valoarea parametrului  $a \in \mathbb{R}$ , pentru care funcția  $f$  poate fi prelungită prin continuitate la  $\mathbb{R}$ , este:  
**a)**  $-4 \ln 2$ ; **b)**  $4 \ln 2$ ; **c)**  $\ln 2$ ; **d)**  $2 \ln 2$ ; **e)**  $-2 \ln 2$ .

12. Valorile parametrilor  $m, n, p \in \mathbb{R}$  pentru care ecuația  $x^4 + 3x^3 - mx^2 + (n+2)x + p - 1 = 0$  are rădăcina triplă  $x = -1$ , sunt:  
**a)**  $m = -3, n = -1, p = 1$ ; **b)**  $m = 3, n = -1, p = 1$ ; **c)**  $m = -3, n = 1, p = 1$ ;  
**d)**  $m = -3, n = -1, p = -1$ ; **e)**  $m = -3, n = -1, p = 2$ .
13. Fie funcția  $f: \mathbb{R} \rightarrow \mathbb{R}$ ,  $f(x) = \frac{ax + a - 2}{x^2 + 1}$ ,  $a \in \mathbb{R}$ . Valoarea parametrului  $a$ , pentru care funcția are un punct de extrem egal cu 1 în punctul de abscisă  $x = 1$ , este:  
**a)** 2; **b)** -2; **c)** 3; **d)** -3; **e)** 0.
14. Dacă  $F(x) = \int \frac{1}{x(1 + \ln x)} dx$  și  $F(e) = 0$ , unde  $e$  este baza logaritmilor naturali, atunci  $F(e^2)$  este:  
**a)**  $\ln \frac{3}{2}$ ; **b)**  $\ln 6$ ; **c)**  $\ln \frac{2}{3}$ ; **d)**  $\ln \frac{1}{2}$ ; **e)**  $\ln 3$ .
15. Valoarea integralei  $\int_1^2 \frac{x^3}{x+2} dx$  este:  
**a)**  $\frac{10}{3} + 8 \ln \frac{3}{4}$ ; **b)**  $\frac{10}{3} - 8 \ln \frac{3}{4}$ ; **c)**  $-\frac{10}{3} + 8 \ln \frac{3}{4}$ ; **d)**  $\frac{10}{3} + \ln \frac{3}{4}$ ; **e)**  $\frac{1}{3} + 8 \ln \frac{3}{4}$ .

**Rezolvare subiect matematică**  
**Varianta I**

1.

$$x_1 + x_2 = -\frac{3}{m};$$

$$x_1 x_2 = -\frac{1}{m} - 1;$$

$$3x_1 x_2 - x_1 - x_2 = -3.$$

2.

$$a_n = a_1 + (n-1) \cdot r$$

$$\left. \begin{array}{l} a_{27} = 3 + 26 \cdot r \\ a_{27} = 81 \end{array} \right\} \Rightarrow r = 3.$$

3.

$$T_{k+1} = C_n^k a^{n-k} b^k;$$

$$T_{k+1} = (-1)^k C_{11}^k x^{\frac{11-k}{3} + \frac{3k}{2}};$$

$$\frac{11-k}{3} + \frac{3k}{2} = 6 \Rightarrow k = 2;$$

- coeficientul lui  $x^6$ :  $(-1)^2 C_{11}^2 = 55$ .

4.

$$\left. \begin{array}{l} x_1 x_2 x_3 = -13 \\ x_1 = 3 + 2i \end{array} \right\} \Rightarrow x_2 x_3 = -\frac{13}{3+2i} = -3 + 2i.$$

5.

$$\Delta = \begin{vmatrix} m & 1 & -2 \\ 2 & 1 & 3 \\ 2m-1 & 2 & 1 \end{vmatrix};$$

- sistem incompatibil  $\Rightarrow \Delta = 0 \Rightarrow m = 3$ ;

- pentru  $m = 3$ , sistemul devine  $\begin{cases} 3x + y - 2z = 2 \\ 2x + y + 3z = 1 \\ 5x + 2y + z = 2 \end{cases}$ ; se observă că ecuația 1 + ecuația 2 = ecuația 3

exclusiv termenii liberi, deci sistemul este incompatibil.

6.

- cum  $\alpha \in \left(\pi, \frac{3\pi}{2}\right) \Rightarrow \sin \alpha < 0$ ;

$$\operatorname{tg} \alpha = \frac{\sin \alpha}{\cos \alpha} = \frac{-\sqrt{1 - \cos^2 \alpha}}{\cos \alpha} = \frac{4}{3}.$$

7.

$\vec{u} \cdot \vec{v} = |\vec{u}| \cdot |\vec{v}| \cdot \cos \alpha$ , unde  $\alpha$  este unghiul format de vectorii  $\vec{u}$  și  $\vec{v}$ ;

$$10 - 10 = \sqrt{29} \cdot \sqrt{29} \cdot \cos \alpha \Rightarrow \cos \alpha = 0 \Rightarrow \alpha = \frac{\pi}{2}.$$

8.

- panta familiei de drepte  $m = \frac{2\lambda + 1}{\lambda + 1}$ ;

- familia de drepte este paralelă cu  $Ox$  dacă  $m = 0 \Rightarrow \lambda = -\frac{1}{2}$ .

9.  $z^2 + z + 1 = 0 \Rightarrow z^3 = 1;$

$$z^{2013} = (z^3)^{671} = 1;$$

- valoarea expresiei  $z^{2013} + \frac{1}{z^{2013}} = 2.$

10. - ecuația dreptei (AC):  $\begin{vmatrix} x & y & 1 \\ -2 & 0 & 1 \\ 0 & 6 & 1 \end{vmatrix} = 0 \Leftrightarrow 3x - y + 6 = 0;$

- distanța de la punctul B la dreapta (AC):  $d(B, AC) = \frac{|3 \cdot 4 - 0 + 6|}{\sqrt{9+1}} = \frac{9\sqrt{10}}{5}.$

11. - funcția  $f: R - \{2\} \rightarrow R$ ,  $f(x) = \begin{cases} \frac{a \ln(3-x)}{x-2}, & x < 2 \\ \frac{2^x - 4}{x-2}, & x > 2 \end{cases}$  poate fi prelungită prin continuitate pe R

dacă  $f_s(2) = f_d(2) < \infty$ , adică  $\lim_{x \rightarrow 2^-} f(x) = \lim_{x \rightarrow 2^+} f(x) \Leftrightarrow -a = 4 \ln 2 \Rightarrow a = -4 \ln 2.$

12. - ecuația are rădăcină triplă  $x = -1 \Leftrightarrow f(-1) = f'(-1) = f''(-1) = 0.$

$$f''(-1) = 0 \Leftrightarrow -6 - 2m = 0 \Rightarrow m = -3;$$

$$f'(-1) = 0 \Leftrightarrow 2m + n = -7 \Rightarrow n = -1;$$

$$f(-1) = 0 \Leftrightarrow -m - n + p = 5 \Rightarrow p = 1.$$

13.  $f'(x) = \frac{-ax^2 + (4-2a)x + a}{(x^2 + 1)^2};$

- funcția  $f$  admite extrem în punctul de abscisă  $x = 1$  dacă  $f'(1) = 0 \Leftrightarrow \frac{4-2a}{4} = 0 \Rightarrow a = 2.$

14.  $t = \ln x \Rightarrow dt = \frac{dx}{x};$

$$F(x) = \int \frac{1}{x(1 + \ln x)} dx = \int \frac{1}{1+t} dt = \ln|1+t| + C = \ln|1 + \ln x| + C;$$

$$\left. \begin{array}{l} F(e) = \ln 2 + C \\ F(e) = 0 \end{array} \right\} \Rightarrow C = -\ln 2;$$

$$F(e^2) = \ln 3 - \ln 2 = \ln \frac{3}{2}.$$

15.

$$\begin{aligned}\int_1^2 \frac{x^3}{x+2} dx &= \int_1^2 (x^2 - 2x + 4) dx - \int_1^2 \frac{8}{x+2} dx \\ &= \left( \frac{x^3}{3} - x^2 + 4x \right) \Big|_1^2 - 8 \ln|x+2| \Big|_1^2 \\ &= \frac{10}{3} + 8 \ln \frac{3}{4}.\end{aligned}$$