

## Chestionar de concurs – varianta &lt;Varianta&gt;

## MATEMATICA

1. Dacă  $z_1 = 2 - 3i$  și  $z_2 = 1 + 3i$ , atunci  $|z_1 + z_2| + 2\bar{z}_1 - z_2$  este:

A	B	C	D
$6 - 3i$	$6 + 9i$	$6 - 9i$	$6 + 3i$

2. Fie  $A$  punctul de intersecție al dreptelor  $2x - y = 3$  și  $x + 3y = -2$  și  $B$  simetricul lui  $A$  față de axa  $Oy$ . Atunci  $|\overrightarrow{2OA} + 3\overrightarrow{AB}| + \overrightarrow{OA} \cdot \overrightarrow{OB}$  este:

A	B	C	D
$2\sqrt{3}$	$2\sqrt{5}$	$2\sqrt{5} - 2$	$2\sqrt{3} + 2$

3. Fie  $a$  și  $b$  numere reale astfel încât funcția  $f(x) = \begin{cases} 3x^2 + 2ax - 1, & x > 1 \\ 4a, & x = 1 \\ \frac{3b \sin(x-1)}{x-1} - 2, & x < 1 \end{cases}$  este continuă în  $x = 1$ . Atunci  $2a + 3b$  este:

A	B	C	D
12	8	7	5

4. Fie  $f_m: \mathbb{R} \rightarrow \mathbb{R}$ ,  $f_m(x) = mx^2 + 2(m+1)x + (m+2)$ ,  $m \in \mathbb{R}^*$ . Vârful parabolei asociate funcțiilor  $f_m$ ,  $m \in \mathbb{R}^*$  se află pe dreapta de ecuație:

A	B	C	D
$y = x + 1$	$y = -x - 1$	$y = -x + 1$	$y = x - 1$

5. Valoarea integralei  $\int_{-2}^2 (|x-1| + |x+1|) dx$  este:

A	B	C	D
10	8	6	0

6. Valoarea sumei  $S = 1 + 4 + 7 + \dots + 298$  este:

A	B	C	D
15150	15000	14900	14950

7. Suma soluțiilor din intervalul  $[0, 2\pi]$  ale ecuației  $\cos 2x + \sin x = 0$  este:

A	B	C	D
$\frac{2\pi}{3}$	$\frac{7\pi}{2}$	$\frac{5\pi}{3}$	$\frac{11\pi}{6}$

8. Primitiva funcției  $f: \mathbb{R} \rightarrow \mathbb{R}$ ,  $f(x) = x\sqrt{x^2 + 1}$  al cărei grafic trece prin punctul  $P(0, \frac{1}{3})$  este:

A	B	C	D
$\frac{\sqrt[3]{x^2 + 1} + 1}{3}$	$\frac{(x^2 + 1)\sqrt{x^2 + 1}}{3}$	$\frac{(x^2 + 1)\sqrt{x^2 + 1}}{4} + 1$	$\frac{(x^2 + 1)\sqrt{x^2 + 1}}{3} + \frac{1}{2}$

9. Suma soluțiilor ecuației  $\begin{vmatrix} x & 1 & 2 \\ 1 & 2 & 3 \\ -1 & -2 & x \end{vmatrix} + 3 \begin{vmatrix} x & -1 \\ 2 & -3 \end{vmatrix} + 3 = 0$  este:

A	B	C	D
2	-2	$-\frac{1}{2}$	$\frac{1}{2}$

## INFORMATICĂ

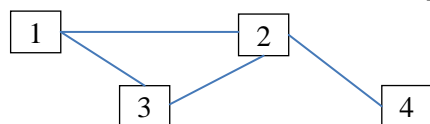
10. Determinați valoarea variabilei a la finalul următoarei secvențe de program:

<pre>int a = 15, b = 12; while (a != b)     if (a&gt;b) a = a-b;     else b = b-a;</pre>	<pre>var a: integer = 15; b: integer = 12; begin     while (a &lt;&gt; b) do         if (a&gt;b) then a := a-b         else b := b-a;     end;</pre>		
A	B	C	D
3	2	1	0

11. Considerăm o funcție care a fost declarată ca în exemplul următor. Care afirmație este adevărată?

<pre>int f(int x) {     int y; }</pre>	<pre>function f(x: integer):integer; var y: integer; begin end;</pre>		
A	B	C	D
x este o variabilă locală y este o variabilă locală	x este o variabilă globală y este o variabilă locală	x este o variabilă locală y este o variabilă globală	x este o variabilă globală y este o variabilă globală

12. Care matrice de adiacență corespunde grafului următor?



A	B	C	D																																																																
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13. Valoarea variabilei j după execuția secvenței de program de mai jos este:

<pre>int i, j=5; for(i=2019; i&lt;=2021; i++)     j=j*3+2; cout&lt;&lt;j;</pre>	<pre>var i, j: integer; begin     j := 5;     for i:=2019 to 2021 do         j := j*3+2;     write(j);</pre>		
A	B	C	D
161	312	64	212

14. Apelul f(2021) al funcției de mai jos generează valoarea:

<pre>int f(int n) {     if(n==0) return 0;     else return n % 10 + f(n/10); }</pre>	<pre>function f(n:integer):integer; begin     if n=0 then f := 0     else f := n mod 10 + f(n div 10); end;</pre>		
A	B	C	D
5	4	1	2

15. Fie mulțimile:  $A = \{a_1, a_2, a_3\}$ ,  $B = \{b_1, b_2\}$ ,  $C = \{c_1, c_2\}$ . Utilizând metoda backtracking se generează toate elementele produsului cartezian  $A \times B \times C$ , primele două elemente fiind  $(a_1, b_1, c_1)$  și  $(a_1, b_1, c_2)$ . Al cincilea element generat este:

A	B	C	D
$(a_2, b_1, c_1)$	$(a_2, b_2, c_2)$	$(a_3, b_2, c_1)$	$(a_3, b_2, c_2)$

16. Se consideră algoritmul următor reprezentat în pseudocod. Notăm cu  $x\%y$  restul împărțirii numărului natural  $x$  la numărul natural nenul  $y$ . Care sunt valorile care se afișează dacă  $n=11$ ?

```

citeste n (numar natural)
c ← 0
pentru i ← 1 la n executa
    c ← (c+1)%10
    scrie c
end pentru

```

A	B	C	D
01234567890	12345678901	1234567890	012345678901

17. Ce se va afișa pe ecran în urma rulării următorului program?

```

char a[3][12];
int i;
int main() {
strcpy(a[0], "examen");
strcpy(a[1], "la");
strcpy(a[2], "informatica");
cout<<a[1]<<' ';
for (i=0;i<=4;i++) cout<<a[2][i];
cout<<' ';
for (i=2;i<4;i++) cout<<a[0][i];
cout<<' '<<a[0][0]<<a[0][1]<<'.';
}

```

```

var a:array[1..3] of string[12];
i: integer;
begin
a[1]:='examen';
a[2]:='la';
a[3]:='informatica';
write(a[2], ' ');
for i:=1 to 5 do write(a[3][i]);
write(' ');
for i:=3 to 4 do write(a[1][i]);
write(' ',a[1][1],a[1][2],'.');
end.

```

A	B	C	D
examen la informatica.	la info ex am.	la infor am ex.	la info am ex.

18. Ce funcție poate fi folosită pentru a asocia o variabilă într-un program cu un fișier de pe disc?

A	B	C	D
fopen în C fstream::open în C++ assign în Pascal	ftell în C fstream::tellp în C++ filepos în Pascal	rename în C std::rename în C++ rename în Pascal	fseek în C fstream::seekp în C++ seek în Pascal

### LIMBA ENGLEZĂ

19. No mother or father wants to be the parent of a brat. Parents everywhere try to control their children's behavior. Some parents spank their children when they misbehave. Other parents won't let their children watch TV or eat dessert. In Japan, parents often send their children outside when they misbehave and tell them they can't come to the house. In the United States, parents do just the opposite: they send their children to their rooms and tell them they can't go outside.

What information is NOT mentioned in the text?

A	B	C	D
Parents try to control their children's behavior by making them stand in a corner.	Parents try to control their children's behavior by spanking them.	Parents try to control their children's behavior by not letting them watch TV.	Parents try to control their children's behavior by sending them outside or to their bedrooms.

20. Never before in history have people been so aware of what is going on in the world. Television, newspapers and radio keep us continually informed and stimulate our interest. The sociologist's interest in the world around him is intense, for society is his field of study. Indeed, he needs to know what is happening in society; he wants to know what makes the social world what it is, how it is organized, why it changes in the ways that it does. Such knowledge is valuable not only for those who make great decisions, but also for you, since this is the world in which you live and make your way.

The passage mentions the fact that whatever goes on in the world today

A	B	C	D
is quickly forgotten by the majority.	only concerns the sociologist.	first makes the headlines in the press.	is of great interest to everyone.

21. Cycling in America has been growing at an amazing rate. Bicycles used to be sold to parents for their children. Now those same parents are buying them for themselves, as well as for their children. And some grandparents are cycling, too. Moreover, people don't simply cycle for fun and for the exercise. Many young executives ride bikes to work as an alternative to adding to the pollution of cities, and to fighting traffic jams, while college and high school students find bikes an economical alternative to cars or buses.

The passage mentions that, in America,

A	B	C	D
More and more people of all ages are now using bicycles.	Few college students can afford to run a car.	No executive feels he can cycle to work.	Most parents feel it is dangerous for children to cycle to school.

22. The man \_\_\_\_\_ tried to stop them.

A	B	C	D
at place	on duty	for control	in post

23. \_\_\_\_\_ is a sport in which two competitors fight using swords.

A	B	C	D
Fencing	Golf	Hockey	Badminton

24. Remember to take the \_\_\_\_\_ when in a department store because you might have to change the dress if it is too small.

A	B	C	D
ticket	bill	invoice	receipt

25. A young porter helped me to carry my \_\_\_\_\_.

A	B	C	D
luggage	baggages	luggages	pieces of luggages

26. I need only \_\_\_\_\_ of the time to have this work finished.

A	B	C	D
one third	third	a threeth	a thirty

27. \_\_\_\_\_ the new TV set \_\_\_\_\_ yet?

A	B	C	D
Is ... repairing	Has ... being repaired	Has...been repaired	Is ... being repairing

Se acordă 1 punct din oficiu.

Președintele Comisiei de Admitere  
Cdor conf. univ. dr. Atodiresei Dinu