MATEMATICA

1. Dacă $x = \frac{\pi}{6}$, valoarea expresiei $E(x) = 3\sin x + 5\cos(2x)$ este:

A	B	C	D
5	$\frac{\sqrt{3}}{2}$	0	4

2. Valoarea lui $n \in \mathbb{N}$ pentru care $C_{n-2}^2 = 21$ este:

A	B	C	D
20	9	3	-1

3. Fie $f:(0,\infty) \to \mathbb{R}$, $f(x) = x^3 - \frac{1}{x}$. Atunci $\int (x^2 + 1)f(x)dx$ este:

A	B	C	D
$3x^2 + \frac{x^2}{2} + \mathcal{C}$	$\frac{x^6}{6} - \frac{x^2}{2} + \frac{x^4}{4} - \ln x + \mathcal{C}$	$5x^4 - 1 + 3x^2 + \frac{1}{x^2} + \mathcal{C}$	$x^2 + 3\sin x + \mathcal{C}$

4. Fie funcţia $f:\mathbb{R} \to \mathbb{R}$, $f(x) = x^2 e^x$. Atunci abscisele punctelor de extrem corespunzătoare funcţiei f sunt:

A	B	C	D
-2 şi 0	0 şi 2	-2	0

5. Punctele de intersecţie a graficului funcţiei $f:\mathbb{R} \to \mathbb{R}$, $f(x) = x^2 + 3x + 2$ cu axa Ox sunt:

A	B	C	D
$A(-7,0), B(-8,0)$	$A(-5,0), B(-6,0)$	$A(-3,0), B(-4,0)$	$A(-1,0), B(-2,0)$

6. Dacă $z_1 = 3 - 2i$ şi $z_2 = 4 + 3i$, atunci $3z_1 - 2z_2$ este:

A	B	C	D
$12 - 10i$	$1 - 12i$	$10 - 12i$	$12 - i$

7. Valoarea limitei

$$\lim_{x \to +\infty} \frac{2x^2 + 1}{x^2 + x + 2}$$

este:

A	B	C	D
0	2	1	$+\infty$

8. Dacă $4x - 1$, $2x + 3$ şi $x - 6$ sunt termeni consecutivi ai unei progresii aritmetice, atunci valoarea lui x este:

A	B	C	D
0	13	$\frac{13}{2}$	$\frac{13}{4}$

9. Pe mulţimea R, se defineşte legea de compoziţie $*$ prin $x * y = 2xy - 6x - 6y + 21$. Mulţimea soluţiilor ecuaţiei $x * x = 35$ este:

A	B	C	D
$\{-2,8\}$	$\{-1,7\}$	$\{2,5\}$	$\{5,8\}$

INFORMATICĂ

10. Se considera algoritmul de mai jos. Care este valoarea returnata de algoritm pentru apelul f **(6)**?

```
f(n)
     step1: if (n==1) then return 1;
     step2: else f= n*f(n-1);
     step3: return f
```

A	B	C	D
720	120	5040	24

11. Instrucțiunea `if` este o instrucțiune:

A	B	C	D
repetitiva (ciclu)	recursiva	nu este o instructiune	alternativă (selecție)

12. Dintr-o grupă de 5 de studenți, profesorul doreşte să formeze o echipă de proiect formată din 3 studenți. Ordinea studenților în cadrul echipei nu contează. Algoritmul de generare a tuturor posibilităților de a forma o astfel de echipă este similar cu algoritmul de generare a tuturor:

A	B	C	D
Combinărilor de 5 elemente, luate câte 3	Aranjamentelor de 5 elemente, luate câte 3	Partițiilor unei mulțimi	Elementelor produsului cartezian, MxMxM, unde M este o mulțime cu 5 elemente

13. Care dintre următorii algoritmi nu poate fi folosit pentru sortarea numerelor dintr-un vector?

A	B	C	D
Metoda căutării binare	Metoda bulelor	Metoda numărării	Metoda selecției

14. Ce funcție C/Pascal calculează radicalul de ordinul 2 al unei expresii?

A	B	C	D
sqrt	sqr	pow	rad

15. Ce funcție poate fi folosită pentru a deschide un fișier în vederea prelucrării datelor din el?

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

16. Se consideră subprogramul de mai jos. Dacă valoarea variabilei `a` înainte de apel este 2, care este valoarea variabilei `a` după apelul `f(a,a)`?

```
void f(int x,int &y)              procedure f(x:integer; var y:integer);
{                                 begin
     y=x+y;                            y:=x+y;
     x=x+y;                            x:=x+y
}                                 end;
```

A	B	C	D
4	6	8	0

17. Se generează cu metoda backtracking, în ordine lexicografică toate permutările de ordinul 5. Primele trei permutări generate sunt: (1 2 3 4 5), (1 2 3 5 4), (1 2 4 3 5). După permutarea (5 2 1 3 4) va fi generată permutarea:

A	B	C	D
(5 2 1 4 3)	(5 2 4 1 3)	(5 2 4 3 1)	(5 1 4 3 2)

18. Se dă matricea $A = (a_{ij})$ cu 5 linii şi 5 coloane, cu indici numerotați de la 1, şi secvența de pseudocod de mai jos. Suma elementelor de pe diagonala secundară a matricei A în urma execuției secvenței va fi egală cu:

```
pentru i ← 1, 5 execută
     pentru j ← 1, 5 execută
          a_ij ← (i+j) mod 5
```

A	B	C	D
5	10	0	15

LIMBA ENGLEZĂ

19. Prague Castle, built in the 9th century, in the Czech Republic, dominates the centre of the city, standing over the River Vltava. Home to the Kings of Bohemia, Holy Roman Emperors, and now the President of the Czech Republic, the castle has many architectural styles that its visitors can admire. According to the Guinness Book of Records, Prague Castle is the largest ancient castle in the world, occupying an area of almost 70,000 square metres (750,000 square feet), at about 570 metres (1,870 feet) in length and an average of about 130 metres (430 feet) wide. The castle is among the most visited tourist attractions in Prague attracting over 1.8 million visitors annually. Prague Castle is:

A	B	C	D
used by the Czech president.	near the city of Prague.	not open for tourists.	crossed by the River Vltava.

20. Hoi An Town is a Southeast Asian trading port dating from the 15th to the 19th century. It has no airport, and no train station either. The only way to get there is by road. You can hire a taxi from the neighbouring city of Da Nang, which does have an airport with daily flights from Hanoi, Ho Chi Minh City and other large Vietnamese cities. There's also a train station in Da Nang, and bus services are plentiful. There is a wide selection of hotels to choose from in both Cua Dai Beach and Hoi An City.

One way of reaching Hoi An from Da Nang is by

A	B	C	D
plane	train	taxi	boat

21. Nowadays, in England, tea is quite the most popular, and also the cheapest, of all drinks. People drink their tea in different ways. Some like it with sugar, some without. Some drink it with milk, some with lemon; yet, one way or another just about everyone drinks tea. This, however, has not always been the case. During the last century, when tea was very expensive, it was kept locked up and the lady of the house had the key. Tea drinking then was quite a ceremony, reserved for the evenings. At breakfast everyone drank beer!

Compared to the past, in England today

A	B	C	D
more and more people prefer tea to beer.	tea is regarded as a luxury.	tea is very cheap and commonly available.	sugar is becoming less and less popular.

22. It's strange that no one can agree on coffee. Some scientists say it is good for us, others say it isn't. There are many reports that say it causes higher blood pressure or that it isn't safe for pregnant women. We can also read articles that say coffee is good for our brain and memory or that it's good for the heart. I suppose the only thing people do agree on is that we shouldn't drink too much of it. Coffee is important for many of us. We drink it when we wake up and we meet people for a chat in cafes like Starbucks.

The majority of people generally agree that coffee

A	B	C	D
is not recommended for our mental health.	should not be drunk in large quantities.	may cause blood pressure in pregnant women.	is not safe for people with heart problems.

23. I've always liked to read old papers about my family because I think they can help me know myself better. I recently read my grandfather's diaries, and I learned a lot of interesting things about his life. Apparently, he spent his childhood in California. He and his parents didn't like being together at all, and when he was 18 he decided to see America. He started on his journey with very little money and travelled east. He continued until he reached Detroit, where he got a job washing up in a restaurant. He fell in love with one of the waitresses, and one day he appeared at her flat with a bunch of roses and asked her to marry him. Surprisingly, she agreed, and he went to live with her in Detroit, where they had 10 children. In time they all got married so, imagine how huge our family is!

Where did the author find information about his grandfather?

A	B	C	D
in old newspapers.	in his grandfather's diaries.	from his grandmother.	from his parents.

24. Mr. and Mrs. Albina don't know where all their children are living now. Some of them, they know, are in Argentina, but they aren't sure where in Argentina. They aren't sure where their other children are, either. But it is understandable that the Albinas can't keep track of their children's addresses and ages. After all, they have 64 children. So, they have the world's largest family. Not one of their children is adopted. How is it possible? Every time Mrs. Albina gave birth, she had twins or triplets.

According to this text, all of the Albina children are

A	B	C	D
living in Argentina.	keep track of their age and addresses.	twins or triplets.	adopted.

25. I enjoy spending my _____ with my friends.

A	B	C	D
free time	all time	feel time	free times

26. He spends his evenings _____.

A	B	C	D
to read	reading	readings	ridings

27. Our summer camp offers a _____ of programs for children of all ages.

A	B	C	D
class	variety	category	collection

28. Venice is _____ for its canals.

A	B	C	D
famous	general	beautiful	common

29. He works as _____ in a big factory.

A	B	C	D
an engineer	a engineer	engineering	inginer

30. I'm so excited! It's my first day _____.

A	B	C	D
at job	in job	in work	at work

31. Choose the correct order using the following words: thing, a, is, modern, complex, ship, a

A	B	C	D
A ship modern is a thing complex.	A modern ship is a complex thing.	A ship is a complex thing modern.	A complex ship modern is a ship.

32. I really love watching the Tomb Hunter films, _____.

A	B	C	D
but if they were scary	unless they are scary	though they are scary	also not they are scary

33. Did you know where _____?

A	B	C	D
this writer born	was writer born	has this writer been born	this writer was born

34. I will call you _____ I get home.

A	B	C	D
as though	as soon as	already	however

35. I work as a teacher and my wife _____, too.

A	B	C	D
do	work	is	does

36. We _____ him since he went to London.

A	B	C	D
haven't seen	didn't see	do not see	will not see