## MATEMATICA

1. Vârful parabolei asociate funcției $f: \mathbb{R} \to \mathbb{R}$, $f(x) = -x^2 + x$ se află în cadranul:

| A | B | C | D |
|---|---|---|---|
| IV | III | I | II |

2. Fie dreptele de ecuații $d_1: 2x + 3y - 5 = 0$ și $d_2: x - 2y + 1 = 0$ și $\{A\} = d_1 \cap d_2$. Coordonatele punctului $A$ sunt:

| A | B | C | D |
|---|---|---|---|
| $A(1,1)$ | $A(0,2)$ | $A(-1,1)$ | $A(0,0)$ |

3. Fie $16^x + 16^{-x} = 23$ atunci $4^x + 4^{-x}$ este egal cu:

| A | B | C | D |
|---|---|---|---|
| 5 | $-1$ | $-5$ | 1 |

4. Fie $f: \mathbb{R} \to \mathbb{R}$, $f(x) = \frac{\sqrt{x^2+1}}{x}$. Atunci $f'(-1)$ este egală cu

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

5. Modulul numărului complex $z = (3 - 4i)(12 + 5i)$ este egal cu:

| A | B | C | D |
|---|---|---|---|
| 65 | 64 | 66 | 68 |

6. Fie $x \in \mathbb{R}$ astfel încât $\sin(x) - \cos(x) = \frac{1}{2}$. Atunci $\sin(2x)$ este egal cu:

| A | B | C | D |
|---|---|---|---|
| $\frac{3}{4}$ | $\frac{1}{4}$ | $\frac{\sqrt{3}}{2}$ | $\frac{1}{2}$ |

7. Dacă $l = \lim_{x \to \infty} \left(\frac{5x+2}{5x+7}\right)^{2x+3}$ atunci $l$ este:

| A | B | C | D |
|---|---|---|---|
| $e$ | $e^{-2}$ | $e^2$ | $\infty$ |

8. Rezultatul calculului $\hat{1} + \hat{3} + \hat{5}$ în $\mathbb{Z}_7$ este:

| A | B | C | D |
|---|---|---|---|
| $\hat{4}$ | $\hat{0}$ | $\hat{3}$ | $\hat{2}$ |

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

| A | B | C | D |
|---|---|---|---|
| $x^2 + 2x + 1 + C$ | $2x^2 - 3x + \ln|x| + C$ | $x^2 - 3x + \ln|x| + C$ | $4x^3 - 3x^2 + \ln|x| + C$ |

# INFORMATICĂ

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

| A | B | C | D |
|---|---|---|---|
| Metoda numărării | Metoda căutarii binare | Metoda selecției | Metoda bulelor |

11. Printre avantajele metodei Backtracking se numără:

| A | B | C | D |
|---|---|---|---|
| Produce un algoritm infinit. | Nu poate fi implementată iterativ. | Permite obţinerea tuturor soluţiilor | Este eficientă din punct de vedere al timpului de lucru |

12. Ce valori se vor afişa in urma executării subprogramului ca urmare a apelului **s2024(10)?**

```
void s2024(int n)
{
  while (n) {
    if (n%2) cout<<'*'; // printf("*")
    else     cout<<n;   // printf("%d",n);
    n--;
  }
  cout<<'.'; // printf(".")
}
```

```
procedure s2024(n: integer);
begin
  while n <> 0 do
  begin
    if n mod 2 <> 0 then Write('*')
    else Write(n);
    n := n - 1;
  end;
  Write('.');
end;
```

| A | B | C | D |
|---|---|---|---|
| 10*8*6*4*2*. | *9*7*5*3*1. | *****97531. | *10*8*6*4*2*. |

13. În C++/Pascal, deschiderea unui fişier pentru operaţia de scriere se face utilizând?

| 1. fstream f("fisier", ios::out); | 1. AssignFile(f, 'fisier'); Rewrite (f) |
|---|---|
| 2. ofstream f("fisier"); | 2. AssignFile (f, 'fisier'); Rewrite (f) |
| 3. fstream f("fisier",ios::in); | 3. AssignFile (f, 'fisier'); Reset (f) |
| 4. ifstream f("fisier"); | 4. AssignFile (f, 'fisier'); Reset (f) |

| A | B | C | D |
|---|---|---|---|
| 1 şi 2 | 1 | 4 | 2 |

14. Care este valoarea funcţiei următoare când este apelată cu parametrul 2024?

```
int f(int x) {
    if (x<0) return 0;
    else return f(x-1);
}
```

```
function f(x:integer):integer;
begin
    if (x<0) then f := 0
    else f := f(x-1);
end;
```

| A | B | C | D |
|---|---|---|---|
| 0 | 2025 | 2024 | 2023 |

15. Care este valoarea lui Y după algoritmul următor, daca X=10?

```
Y = 0
daca X > Y atunci
  Y = -X
sfarsit
```

| A | B | C | D |
|---|---|---|---|
| -10 | 0 | 10 | 5 |

16. Ce afişează următoarea secvenţă de program C/Pascal?

```
char s[25]="Admitere 2024";
cout<<strlen(s); // printf("%d",strlen(s));
```
```
String s:='Admitere 2024';
write(length(s));
```

| A | B | C | D |
|---|---|---|---|
| 0 | 13 | 24 | 25 |

17. Un program generează şi scrie într-un fişier toate permutările unei mulţimi cu n elemente, câte o permutare pe un rând. Pentru n=6 câte rânduri va avea fişierul rezultat?

| A | B | C | D |
|---|---|---|---|
| 120 | 36 | 720 | 6 |

18. Tablourile unidimensionale X şi Y au elementele: X = (0,5,23,53,73) şi Y = (3,7,53,73). În urma interclasării lor în ordine crescătoare se obţine tabloul cu elementele:

| A | B | C | D |
|---|---|---|---|
| (0,3,5,7,23,53,53,73,73) | (53,73) | (0,3,5,7,23,53,73) | (0,5,23,53,73,3,7,53,73) |

**Reading Comprehension**

Most reality TV shows center on two common motivators: fame and money. The shows transform waitresses, hairdressers, investment bankers, counselors, and teachers, to name a few, from obscure to famous figures. A lucky few successfully turn their 15 minutes of fame into celebrity. Even if you are not interested in fame, you can probably understand the desire for lots of money. Whatever their attraction, these shows are among the most popular on television. The networks are quickly replacing more traditional dramas and comedies with reality TV programs, which earn millions in advertising revenue. Whether you love it or hate it, one thing is for sure - reality TV is here to stay!

19. Before they become famous, reality TV participants are:

| A | B | C | D |
|---|---|---|---|
| unique and distinctive. | unknown and undistinguished. | famous and notorious. | rich and famous. |

20. We find out from the text that:

| A | B | C | D |
|---|---|---|---|
| reality TV participants earn millions. | everybody loves reality TV programs. | dramas and comedies are replacing reality TV programs. | reality TV can turn some of its participants into celebrities. |

The traditional family, with a wage-earning father and a wife who stays at home to take care of the kids, is a disappearing species in the U.S. The Census Bureau estimates that just 50 percent of American families fit this profile. But many of the nation's institutions don't recognize the growing number of non-traditional groups who are living together: gay couples, foster parents, and stepfamilies. Now, California has become the first state in the nation to publicly register these non-traditional groups as official families.

21. What do we learn from the text?

| A | B | C | D |
|---|---|---|---|
| The percentage of kids born to each family is increasing. | The number of traditional families is decreasing. | Many of the nation's institutions are fading away. | Non-traditional groups are now officially recognized all over the world. |

22. Which of the following is NOT an example of non-traditional groups as official families?

| A | B | C | D |
|---|---|---|---|
| gay couples | stepfamilies | foster parents | adopted kids |

Soccer fanatic Glenys Grenfell is so single-minded about football that she refuses to let anything stand in the way of her Saturday afternoon match, even motherhood! Two weeks after her son David was born in 1959, Glenys was back to cheer the team on, while her parents were at home babysitting! "They looked after David until he was about 7, and then, I started taking him to matches with me. He came with me occasionally up until 3 years ago, but he didn't enjoy it as much as I did. In fact, no one I know does. My family and friends all think I'm a bit crazy!"
She admits it is a costly hobby, especially going to away matches, because she prefers to drive herself rather than travel on the supporters' bus.

23. According to this text, Glenys doesn't know anyone who likes going to football matches:

| A | B | C | D |
|---|---|---|---|
| as much as she does. | on regular basis. | as much as David does. | on Sunday afternoon. |

24. Which sentence best summarizes this text?

| A | B | C | D |
|---|---|---|---|
| Glenys is a football fanatic. | Glenys takes her parents to matches. | Glenys is crazy. | Glenys babysits for her son. |

**Vocabulary & Grammar**

25. They met sometime in _____ '70s.

| A | B | C | D |
|---|---|---|---|
| An | - | a | the |

26. I learned how to _____ a bicycle when I was a kid.

| A | B | C | D |
|---|---|---|---|
| ride | lead | conduct | drive |

27. There is a very interesting _____ in the newspaper about green energy.

| A | B | C | D |
|---|---|---|---|
| news | documentary | programme | article |

28. In football, players _____ the ball.

| A | B | C | D |
|---|---|---|---|
| hurt | smash | knock | kick |

29. A _____ from a local TV station asked for details of the accident.

| A | B | C | D |
|---|---|---|---|
| broadcaster | salesman | photographer | reporter |

30. The kids disrespected the neighbours. _____, they are now grounded.

| A | B | C | D |
|---|---|---|---|
| Nevertheless | On the other hand | As a result | In addition |

31. I didn't know you were here already. When _____?

| A | B | C | D |
|---|---|---|---|
| had you arrived | have you arrived | did you arrive | were you arriving |

32. I _____ to the teacher for being late.

| A | B | C | D |
|---|---|---|---|
| excused | forgave | apologized | pardoned |

33. No wonder she's good with all the _____ classes she has weekly.

| A | B | C | D |
|---|---|---|---|
| particular | private | personal | peculiar |

34. A child must have _____ food.

| A | B | C | D |
|---|---|---|---|
| a | any | an | — |

35. Choose the correct order: *of, war, lives, communication, clear, in, a, times, saves*

| A | B | C | D |
|---|---|---|---|
| In a war of times, saves lives clear communication. | Lives saves clear communication in times of war. | In times of war, clear communication saves lives. | Saves lives in times of war clear communication. |

36. House prices have gone up this year. _____, flats prices remained the same.

| A | B | C | D |
|---|---|---|---|
| In contrast | Therefore | In case | Consequently |

Se acordă 1 punct din oficiu.

Preşedintele Comisiei de Admitere

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