MATEMATIKA (INFORMATIKA BILAN)

1. Hisoblang:
$$\frac{1\cdot 2\cdot 3+3\cdot 6\cdot 9+5\cdot 10\cdot 15+7\cdot 14\cdot 21}{2\cdot 4\cdot 6+6\cdot 12\cdot 18+10\cdot 20\cdot 30+14\cdot 28\cdot 42}$$
A) $\frac{1}{2}$ B) $\frac{1}{16}$ C) $\frac{1}{4}$ D) $\frac{1}{8}$

2. Oybek ikkita masalani 36 minutda yechdi. U birinchi masalani yechishga ikkinchisini yechishga qaraganda 6 minut ko‘p vaqt sarfladi. Oybek ikkinchi masalani necha minutda yechgan?
A) *21* B) *15* C) *18* D) *20*

3. 110 soni 10, 14, 18, ... arifmetik progressiyaning nechanchi hadi?
A) *25* B) *26* C) *24* D) *27*

4. Hisoblang: $\operatorname{tg}\left(\operatorname{arctg}2-\operatorname{arctg}\frac{1}{2}\right)$
A) $\frac{3}{4}$ B) $\frac{3}{2}$ C) $\frac{4}{3}$ D) $\frac{2}{3}$

5. Hisoblang: $\arcsin(\sin 3)$
A) $\frac{\pi}{2}-3$ B) 3 C) $\pi-3$ D) $\frac{\pi-3}{2}$

6. Agar $\log_{27} a=b$ bo‘lsa, $\log_{\sqrt[6]{a}}\sqrt{3}$ ni toping.
A) $\frac{2}{b}$ B) $-\frac{1}{b}$ C) $\frac{1}{b}$ D) $-\frac{2}{b}$

7. $\frac{2^{3n-4}\cdot 2^{5+6n}}{2^{1+3n}}$ ni soddalashtiring.
A) 2^{6n+1} B) 4^{3n} C) 4^{3n-1} D) 2^{3n}

8. Agar $2^x=152$ bo‘lsa, $|x-8|+|x-6|$ ifodani soddalashtiring.
A) 2 B) $14-2x$ C) $2x-14$ D) -2

9. x ning qanday qiymatida $3(2-x)-8=10$ tenglik o‘rinli bo‘ladi?
A) -4 B) -6 C) 4 D) 6

10. $x^2-4|x|-a+3=0$ tenglamaning $a\geq 3$ bo‘lgandagi ildizlari yig‘indisini toping.
A) -4 B) 4 C) -3 D) 0

11. $(x^2+14x+14)(x^2+x+14)=14x^2$ tenglamaning haqiqiy ildizlari yig‘indisini toping.
A) -14 B) -15 C) -13 D) -16

12. $x^2+5x+3\leq 0$ tengsizlikning barcha butun yechimlari yig‘indisini toping.
A) -10 B) -14 C) -13 D) -15

13. Tengsizlikni yeching: $\frac{\arccos\left(-\frac{3}{\pi}\right)\cdot\log_{\frac{3}{\pi}}\frac{\pi}{4}}{1-2\log_{\log_2 x}2}\geq 0$
A) $x\in(2;3)\cup(16;+\infty)$
B) $x\in(1;2)\cup(18;+\infty)$
C) $x\in(1;2)\cup(16;+\infty)$
D) $x\in(1;2)\cup(15;+\infty)$

14. $y=\frac{1}{2}\sin\frac{x}{2}\cos\frac{x}{2}$ funksiyaning asosiy davrini toping.
A) 2π B) π C) 4π D) $\frac{\pi}{2}$

15. $y=5\sin 9x+3\sin 15x$ funksiyaning hosilasini toping.
A) $90\cos 3x\cos 12x$ B) $-90\cos 3x\cos 12x$
C) $90\sin 3x\sin 12x$ D) $-90\sin 3x\sin 12x$

16. $y=\cos 3x\cos 12x$ funksiya uchun boshlang‘ich funksiyani toping.
A) $\frac{1}{18}\cos 9x-\frac{1}{30}\cos 15x+\mathrm{C}$
B) $\frac{1}{18}\sin 9x-\frac{1}{30}\sin 15x+\mathrm{C}$
C) $\frac{1}{18}\cos 9x+\frac{1}{30}\cos 15x+\mathrm{C}$
D) $\frac{1}{18}\sin 9x+\frac{1}{30}\sin 15x+\mathrm{C}$

17. Teng yonli uchburchakning uchidagi burchagi 16° ga teng. Yon tomoni bilan asosidagi burchak bissektrisasi tashkil qilgan o‘tmas burchakni toping.
A) 139° B) 141° C) 131° D) 123°

18. $ABCD$ parallelogrammda $BD=6\sqrt{2}$, $\angle ADB=60^\circ$, $\angle CDB=75^\circ$ bo‘lsa, AB ni toping.
A) $6\sqrt{3}$ B) $3\sqrt{3}$ C) $6\sqrt{2}$ D) $4\sqrt{2}$

19. Aylanaga ichki chizilgan trapetsiya diagonali yon tomoniga perpendikulyar hamda asosi bilan 30° li burchak tashkil etadi. Shu trapetsiya perimetrining aylana uzunligiga nisbatini toping.
A) $\frac{3}{2\pi}$ B) $\frac{5}{2\pi}$ C) $\frac{2}{\pi}$ D) $\frac{4}{\pi}$

20. Asoslarining radiuslari $2\sqrt{2}$ va $11\sqrt{2}$ ga teng bo‘lgan kesik konus va unga tengdosh silindrning balandliklari ham o‘zaro teng bo‘lsa, silindr asosining radiusini toping.
A) $7\sqrt{2}$ B) $5\sqrt{2}$ C) $8\sqrt{2}$ D) $6\sqrt{2}$

21. $ABCDA_1B_1C_1D_1$ to‘g‘ri burchakli parallelepipedda $\overrightarrow{AA_1} = \vec{a}$, $\overrightarrow{AB} = \vec{b}$ va $\overrightarrow{AD} = \vec{c}$ uchun $\overrightarrow{AC_1}$ ni $\vec{a}$, $\vec{b}$ va $\vec{c}$ vektorlar orqali ifodalang.
A) $\vec{a}+\vec{b}+\vec{c}$ B) $\vec{a}+\vec{b}-\vec{c}$ C) $\vec{a}+\vec{c}-\vec{b}$
D) $\vec{b}+\vec{c}-\vec{a}$

22. $A = \{1;3;5;6;8;10\}$ va $B = \{5;6;7;8;10\}$ to‘plamlar berilgan. $A \cup B$ to‘plam elementlari sonini toping.
A) *8* B) *7* C) *11* D) *6*

23. Noto‘g‘ri tengliklarni toping:
1) $\log_a b \cdot \log_a c = \log_a (b+c)$;
2) $\log_a b + \log_a c = \log_a (b \cdot c)$;
3) $\log_a b - \log_a c = \log_a (b : c)$;
4) $\log_a b : \log_a c = \log_a (b-c)$;
5) $\log_a b : \log_a c = \log_a (b : c)$
A) *2; 3; 4* B) *1; 2; 4* C) *1; 4; 5* D) *1; 3; 5*

24. To‘g‘ri qoidalarni toping:
1) $\int \frac{dx}{\sqrt{a^2-x^2}} = \arccos\frac{x}{a} + C$;
2) $\int \frac{dx}{\sqrt{a^2-x^2}} = \arcsin\frac{x}{a} + C$;
3) $\int \frac{dx}{a^2+x^2} = \frac{1}{a}\text{arc}tg\frac{x}{a} + C$;
4) $\int \frac{dx}{a^2+x^2} = -\text{arc}ctg\frac{x}{a} + C$;
5) $\int \frac{dx}{a^2+x^2} = -\frac{1}{a}\text{arc}ctg\frac{x}{a} + C$;
6) $\int \frac{dx}{\sqrt{a^2-x^2}} = -\frac{1}{a}\arccos\frac{x}{a} + C$
A) *1; 3; 6* B) *1; 2; 4* C) *2; 3; 4* D) *2; 3; 5*

25. Quyidagi tasdiqlardan qaysilari to‘g‘ri?
1) uchburchakka tashqi chizilgan aylananing radiusi $R = \frac{abc}{2S}$ (a, b, c – uchburchakning tomonlari, S – uchburchak yuzi) formula bilan hisoblanadi; 2) radiusi R ga, markaziy burchagi α ga teng doiraviy sektorning yuzi $S = \frac{\pi R^2}{360}\alpha$ formula bilan hisoblanadi; 3) tomoni a ga, burchaklaridan biri α gateng rombning yuzi $S = a^2 \sin\alpha$ formula bilan hisoblanadi;
4) diagonallari d_1 va d_2 ga, ular orasidagi burchagi α ga teng ixtiyoriy qavariq to‘rtburchakning yuzi $S = d_1 d_2 \sin\alpha$ formula bilan hisoblanadi;
5) o‘xshash figuralar yuzlarining nisbati ularning mos chiziqli o‘lchovlari kvadratlarining nisbatiga teng.
A) *2; 3; 5* B) *1; 2; 5* C) *1; 3; 5* D) *1; 3; 4*

26. Quyida turli sanoq sistemalaridagi sonlar mos qo‘yilgan `A`, `B`, `C` va `D` mulohazalar berilgan (qavs ichida sanoq sistemasi asosi berilgan). Rost mulohazalarga mos sonlarni ikkilik sanoq sistemasida tasvirlang. Yolg‘on mulohazalarni qiymatini aynan `0` ga teng deb oling. Ikkilik sanoq sistemasidagi `0` ni `Yolg‘on`, `1` ni `Rost` sifatida qarab `NOT (A AND B OR C) OR D` ifodaga mos mantiqiy sxema natijasini aniqlang.
`A=‘‘Chop etish qurilmasi tarkibiga printer va plotterning ikkalasi kiradi’’=10011(2)`
`B=‘‘ENIAC birinchi elektron hisoblash mashinasi hisoblanadi’’=21(10)`
`C=‘‘Axborot nazariyasida bir nechta axborot asosida yangi axborot hosil qilish axborotni qayta ishlash deb ham hisoblanadi’’=24(8)`
`D=‘‘Kompyuterning barcha turdagi xotirasini foydalanuvchi formatlashi mumkin’’=231(4)`
A) `10011` B) `01010` C) `10101` D) `00010`

27. Quyida berilgan mulohazalarning qiymatlari asosida `EMAS((A YOKI B) VA EMAS C)` mantiqiy ifoda qiymatini hisoblang.
`A=‘‘FAT32, NTFS, LINUX dasturlarining barchasi fayl sistemasi hisoblanadi’’`
`B=‘‘O‘zbekistonda ishlab chiqarilgan Freeware turidagi dasturlardan biri DOPPIX’’`
`C=‘‘Ba’zi dasturlar installyatsiya qilinmaydi’’.`

A) *ROST*
B) *Mantiqiy ifoda xato yozilgan*
C) *YOLG‘ON*
D) *Ba’zi mulohazalar qiymatini aniqlab bo‘lmaydi*

28. `MS Excel`. Agar `A1=ДЛСТР("MS Word")`, `A2=19`, `B2=3*B1` va `=ЕСЛИ(ИЛИ(A2*B1-B2>512; B1*A1-A2>64); B1^2-A1; B2^2-A1)` formula natijasi 434 bo‘lsa, `B1` katakka yozish mumkin bo‘lgan sonlar yig‘indisini aniqlang.
A) *-7* B) *7* C) *-21* D) *21*

29. Quyudagi ko‘rinishdagi web-hujjat berilgan. Web-hujjatdagi noma’lum `X` va `Y` teglari o‘rniga yozish mumkin bo‘lgan teglar berilgan javobni shunday tanlangki, faqat ikkita, ya’ni tagchiziqli va qalin shrift xususiyatiga ega bo‘lgan sonlar yig‘indisi 11 ga teng bo‘lsin.

```
<html>
<strong><X>1<Y>2</Y>3<Y>4</X>5</strong>
<X>6</Y></X>
</html>
```

A) `X=u, Y=b` B) `X=u, Y=p` C) `X=u, Y=i`
D) `X=br, Y=u`

30. Quyida A va B natural sonlarning eng katta umumiy bo‘luvchisini hisoblash dasturi berilgan. Dastur faqat to‘g‘ri natijalar berishi va xotiradan kam joy egallashi uchun qaysi javobda keltirilgan o‘zgaruvchilar tavsifi kerak?

```
Begin randomize;
 a:=random(255)+1; b:=random(255)+1;
 n:=a; m:=b;
 while(a<>b) do
     if (a>b) then a:=a-b else b:=b-a;
 n:=n*m; m:=n div a;
 writeln(m);
End.
```

A)`a:Word; b:Word; n:LongInt; m:LongInt;`

B)`a:Byte; b:Byte; n:Integer;m: Integer;`

C)`a:Byte; b:Byte; n:Word; m:Word;`

D)`a:Word; b:Word; n:Integer; m:Word;`

TO‘G‘RI JAVOBLAR

№	Javob		№	Javob		№	Javob	
1	D		11	B		21	A	
2	B		12	A		22	B	
3	B		13	C		23	C	
4	A		14	A		24	D	
5	C		15	A		25	A	
6	C		16	D		26	B	
7	B		17	D		27	A	
8	A		18	A		28	D	
9	A		19	B		29	D	
10	D		20	A		30	C	