MATEMATIKA (INFORMATIKA BILAN)

1. Agar $a > 0$ bo'lsa, $y = \dfrac{a}{|x+a|}$ funksiyaning vertikal asimptotasini toping.

A) $y = -a$ B) $x = -a$ C) $x = a$ D) $y = 1 - a$

2. Ta'lim muassasasida barcha o'quvchilar kamida bitta – ingliz yoki nemis tilida so'zlasha oladilar, ayrimlari esa ikkala tilni ham biladilar. O'quvchilarning 85% i ingliz tilini, 65% i esa nemis tilini biladilar. Ikkala tilni ham biladigan o'quvchilar barcha o'quvchilarning necha foizini tashkil etadilar?

A) 60   B) 45   C) 50   D) 75

3. Uchlari $A(-5;3)$ va $B(-2;2)$ nuqtalarda bo'lgan AB kesmaning uzunligini toping.

A) $\sqrt{11}$ B) 4   C) $\sqrt{10}$ D) 3

4. Asosining tomoni $4\sqrt{3}$ ga va balandligi 4 ga teng bo'lgan uchburchakli muntazam piramidaga tashqi chizilgan sharning radiusini toping.

A) 6   B) 3   C) 5   D) 4

5. $\dfrac{5^x}{5^x - 4^x} < 5$ tengsizlikning eng katta butun manfiy va eng kichik butun musbat yechimlari ko'paytmasini toping.

A) 2   B) –2   C) –1   D) 4

6. a va b natural sonlarning eng katta umumiy bo'luvchisi 6 ga teng bo'lsa, $a + 5b$ va b sonlarning eng katta umumiy bo'luvchisi nechaga teng?

A) 1   B) 6   C) 4   D) bir qiymatli aniqlab bo'lmaydi

7. $\dfrac{n^3 - 3}{n - 1}$ ifoda butun qiymatlarni qabul qiladigan barcha natural n sonlar yig'indisini toping.

A) 5   B) 4   C) 7   D) 3

8. Tomoni $8\sqrt{3}$ ga teng $ABCDEF$ muntazam oltiburchakning FD diagonali EA va EC diagonallarini mos ravishda P va K nuqtalarda kesib o'tadi. PK kesma uzunligini toping.

A) 9   B) 12   C) 8   D) 16

9. $y > 0$ bo'lsin. To'rtburchakning uchlari to'g'ri burchakli dekart koordinatalar sistemasida quyidagicha berilgan: $A(1;0)$, $B(1;y)$, $C(11;y)$ va $D(13;0)$. To'rtburchak diagonallarining o'rtalari orasidagi masofani toping.

A) $\sqrt{2}$ B) y ga bog'liq   C) 2   D) 1

10. $\displaystyle\int\limits_{-\frac{\pi}{3}}^{\frac{\pi}{3}} \left(\sin 2x - \sin x + \frac{3}{2x}\right) dx$ aniq integralni hisoblang.

A) $\dfrac{3}{4}$ B) 1   C) $\dfrac{\sqrt{3}}{3}$ D) $\dfrac{\sqrt{3}}{3} - \dfrac{1}{2}$

11. Konus uchidan unga ichki chizilgan shar markazigacha masofa 2 ga, konus yasovchisi esa 4 ga teng. Konus yasovchisi va asos tekisligi orasidagi burchakning tangensini toping.

A) $\dfrac{4}{3}$ B) 4   C) 3   D) $\dfrac{3}{4}$

12. Agar $f(0) = 15$, $f(2) = 30$, $f(4) = 90$ bo'lsa, $f(x) = a + b \cdot c^x$ funksiya ko'rinishini toping.

A) $f(x) = 1 + 2 \cdot 3^x$ B) $f(x) = 10 + 5 \cdot 2^x$
C) $f(x) = 5 + 2 \cdot 3^x$ D) $f(x) = 26 + 4 \cdot 2^x$

13. $y = 5\cos^2 x + \sin^2 x$ funksiya butun qiymatlari yig'indisini toping.

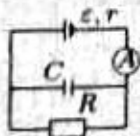A) bunday qiymatlar mavjud emas   B) 14   C) 15
D) bunday qiymatlar cheksiz ko'p

14. Agar $x = -1$ bo'lsa,
$a^2 \dfrac{(x-b)(x-c)}{(a-b)(a-c)} + b^2 \dfrac{(x-a)(x-c)}{(b-a)(b-c)} + c^2 \dfrac{(x-a)(x-b)}{(c-a)(c-b)}$ ning
qiymatini toping. (Bu yerda $(a-b)(a-c)(b-c) \neq 0$)

A) 1   B) 2   C) 0   D) a, b, c ga bog'liq

15. $\log_2 10 \cdot \lg 4$ ni hisoblang.

A) $\lg 40$ B) 1   C) 2   D) 3

16. $y = \log_5(\sin^2 2x + \cos^2 2x)$ funksiyaning $x = \dfrac{1}{2}$ nuqtadagi ikkinchi tartibli hosilasining qiymatini toping.

A) 0   B) $-\log_5 2$ C) 1   D) $\log_5 2$

17. p ning qanday qiymatlarida $4p = 3 - 8x$ tenglamaning ildizi $(2;4)$ oraliqqa tegishli bo'ladi?

A) $3 < p < 4$ B) $-\dfrac{29}{4} < p < -\dfrac{13}{4}$ C) $2 < p < 3$
D) $1 < p < 2$

18. m, n natural sonlar $m^2 = n^2 + 229$ tenglikni qanoatlantirsa, n ni toping.

A) 112   B) 110   C) 115   D) 114

19. $\alpha + \beta + \gamma = \pi$, $\sin\alpha \sin\beta \sin\gamma = -\dfrac{1}{2}$ bo'lsa, $\sin 2\alpha + \sin 2\beta + \sin 2\gamma$ ning qiymatini toping.

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

20. Teng yonli ABC uchburchakning AC asosida D nuqta shunday olinganki $AD = 4$, $DC = 6$ tengliklar bajariladi. ABD va DBC uchburchaklarga ichki chizilgan aylanalar BD to'g'ri chiziqqa mos ravishda M va N nuqtalarda urinadilar. MN kesma uzunligini toping.

A) 1   B) $\sqrt{2}$ C) $\sqrt{3}$ D) 2

21. Beshta a_1, a_2, a_3, a_4, a_5 tub son ayirmasi 6 ga teng bo'lgan arifmetik progressiyani tashkil qiladi. $a_1 + a_3$ ni toping.

A) 34   B) 22   C) bir qiymatli aniqlab bo'lmaydi   D) 28

22. C nuqta – AB kesmaning o'rtasi. AC va BC kesmalarda mos ravishda M, N nuqtalar shunday olinganki, $AM:MC = CN:NB$ munosabat bajariladi. Agar AB kesma uzunligi 48 ga teng bo'lsa, MN kesma uzunligini toping.

A) 24   B) 16   C) 36   D) 18

23. $P(x) = (3x+1)^{2017} \cdot (8x+1)^{2016} + (4x-1)^3 \cdot (2x-1)^2 + x - 2$ ko'phadning ozod hadini toping.

A) –1   B) 1   C) –2   D) 0

24. Natural n sonning kvadrati 8 ga bo'linganda hosil bo'lishi mumkin bo'lgan qoldiqlar yig'indisini toping.

A) 5   B) 4   C) 7   D) 6

25. $y = \sin\dfrac{x}{2}$; $y = 0$; $x = \dfrac{\pi}{2}$; $x = \pi$ chiziqlar bilan chegaralangan shaklning yuzini toping.

A) 2   B) 1,5   C) $0,5\sqrt{2}$ D) $\sqrt{2}$

26. Hisoblang: $\dfrac{\sqrt{1-\frac{1}{2}} \cdot \sqrt{1-\frac{1}{3}} \cdot \sqrt{1-\frac{1}{4}} \cdot \sqrt{1-\frac{1}{5}} \cdot \sqrt{1-\frac{1}{6}}}{\sqrt{1-\frac{1}{7}} \cdot \sqrt{1-\frac{1}{8}} \cdot \sqrt{1-\frac{1}{9}}}$

A) $-\sqrt{13}$ B) $\dfrac{\sqrt{2}}{9}$ C) 3   D) $\dfrac{1}{3}$

27. Tengsizlikning butun yechimlar yig'indisini toping.
$2(x-3)^2 - (x-1)(x+3) \le 0$

A) 90   B) 78   C) 77   D) 84

28. Agar $f(x) = x^{\sin 2x}$ bo'lsa, $f'\left(\dfrac{\pi}{4}\right)$ ni toping.

A) 0 B) $\dfrac{\pi}{4}$ C) $\dfrac{\pi}{2}$ D) 1

29. a va b natural sonlarning EKUB i 30 ga, ko'paytmasi 36000 ga teng bo'lsa, shu sonlarning EKUK ini toping.

A) 1000 B) 1800 C) 900 D) 1200

30. $\sqrt{2x^3 - 5x^2 - 8x + 2} = \sqrt{2}(x - 1)$ tenglama nechta yechimga ega?

A) 1 B) 0 C) 2 D) 3

31. Lotincha "Informatio" so'zi nimani anglatadi?

A) tushuntirish, tavsiflash

B) ma'lumotlar, yangiliklarni olish   C) xabar berish

D) ko'rishni ta'minlash

32. Barcha x, $a \in R$ uchun mantiqiy ifoda qiymatini aniqlang:
$$\neg\left((x^2 + a^2) > 1 \wedge (x^4 + 1) > 1 \vee (x^3 \leq 0)\right)$$

A) Sodda mulohazalardan ba'zilarini qiymatini aniqlab bo'lmaydi

B) Yolg'on

C) Rost

D) Mantiqiy ifoda xato yozilgan

33. Aniq bir predmet sohasi bo'yicha masalalar yechishga mo'ljallangan dasturlar majmuasi bu - ....

A) yordamchi dasturiy ta'minot

B) amaliy dasturiy ta'minot

C) dasturlar yaratish vositalari

D) tizim (sistema)li dasturiy ta'minot

34. $A1=-8$, $B1=6$, $B2=4$ bo'lsin. Quyidagi formula natijasi -40 ga teng bo'lishi uchun $A2$ katakka kiritilishi kerak bo'lgan qiymatni aniqlang.
=ЕСЛИ(И(A1+B2<A2*B1;A1*A2<0);
A1*B2-15+A2;A1*B1+5-A2)

A) 9 B) 5 C) 7 D) 4

35. Internet qanday tarmoq turiga mansub?

A) mintaqaviy   B) global   C) korporativ   D) lokal

36. Paskal tilida qaysi javobda A[k]=N-k formula orqali aniqlangan N ta elementli massivning elementlari qiymatini kamayish tartibida ekranga chiqaruvchi dastur lavhasi yozilgan?

A) For j:=1 to N do writeln(A[N-j+1]);

B) For k:=1 downto N do writeln(A[k]);

C) For m:=1 to N do writeln(A[m]);

D) For x:=N downto 1 do writeln(A[x]);

FIZIKA

37. Agar sxemadagi ampermetrning ko'rsatishi $I = 3$ A bo'lsa, tok manbaining qisqa tutashuv toki necha amperga teng bo'ladi? $\varepsilon=12$ V, $R=2\ \Omega$, $C=4\ \mu F$
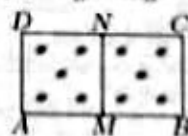

A) 6 B) 5 C) 8 D) 10

38. Maydon kuchlanganligi $3,0 \cdot 10^6$ V/m bo'lgan elektr maydonida elektron tezlashtirilmoqda. Agar relyativistik effektlar hisobga olinmasa, $1,0$ ns so'ng elektronning tezligi nimaga teng bo'lib qolar edi (m/s)? Elektronning massasi va zaryadi mos ravishda $9,1 \cdot 10^{-31}$ kg va $1,6 \cdot 10^{-19}$ C.

A) $2,6 \cdot 10^8$ B) $5,3 \cdot 10^8$ C) $1,6 \cdot 10^8$ D) $3,1 \cdot 10^8$

39. Elektromagnit to'lqinning elektr va magnit maydon kuchlanganliklari mos holda $E = E_0 \sin\left(\omega t + \dfrac{\pi}{4} + \varphi_0\right)$ va $H = H_0 \sin\left(\omega t + \dfrac{\pi}{4}\right)$ tenglamaga asosan o'zgaradi. Bu yerda φ_0 nimaga teng?

A) $-\dfrac{\pi}{2}$ B) $-\dfrac{3\pi}{4}$ C) 0 D) $\dfrac{\pi}{4}$

40. Qaysi javobda markazga intilma kuch bo'la oladigan kuchlar to'liq ko'rsatilgan?
1) tinchlikdagi ishqalanish kuchi; 2) elastiklik kuchi; 3) Lorens kuchi; 4) gravitatsion kuchlar.

A) $3, 4$ B) $1, 3, 4$ C) $1, 2$ D) $1, 2, 3, 4$

41. Foton spinining antiproton spiniga nisbati nimaga teng?

A) 0 B) 2 C) 1 D) $1/2$

42. Ballondagi ideal gazning ichki energiyasini 15% ga orttirish uchun uning bosimini necha marta oshirish kerak?

A) $1,2$ B) $1,15$ C) $1,3$ D) $1,25$

43. Tomonlarining uzunligi a bo'lgan $ABCD$ kvadratning A, B va C uchlariga mos holda q, $3q$, va $2q$ zaryadlar joylashtirilgan. Kvadratning A uchidagi zaryadni D uchiga ko'chirish uchun elektr maydon qanday ish bajaradi?

A) $-\dfrac{19kq^2}{100a}$ B) $\dfrac{19q^2}{100a}$ C) 0 D) $\dfrac{29kq^2}{100a}$

44. Dastlabki tezligi 18 km/h bo'lgan nuqta 3 m/s² tezlanish bilan harakatlanib, 16 m yo'l yuradi. Nuqtaning oxirgi tezligi (m/s) topilsin.

A) 11 B) 13 C) 2 D) 12

45. To'g'ri to'rtburchak shaklidagi $ABCD$ ramkaning o'rtasiga yengil va ishqalanishsiz harakatlana oladigan MN to'siq o'rnatilgan bo'lib, ramkaning $AMND$ qismi sovun eritmasining pardasi, $MBCN$ qismi esa suv pardasi bilan qoplangan. Sovun eritmasining sirt taranglik koeffitsiyenti 40 mN/m, suvniki 72 mN/m bo'lsa, MN to'siqqa suyuqlik pardalari tomonidan ta'sir qiluvchi natijaviy kuch qancha (mN) bo'ladi? AB tomon uzunligi 6 sm, BC tomon uzunligi 3,8 sm ga teng.

A) $2,64$ B) $1,22$ C) $1,32$ D) $2,43$

46. Siqilgan geliy gazi 3 atm. bosim ostida ko'ndalang kesim yuzasi 83,1 sm² bo'lgan nay orqali oqib o'tmoqda. Nayning kesim yuzasidan 25 s ichida 200 g massali gaz oqib o'tgan bo'lsa, gazning oqim tezligi (m/s) qanday bo'lgan? Gaz temperaturasi $27°C$, $M_{He}=4$ g/mol.

A) $0,8$ B) $1,2$ C) 2 D) $2,4$

47. Sistema n ta o'zaro ketma-ket bog'langan brusoklardan iborat. Sistema birinchi brusokka qo'yilgan $F=18$ N kuch ta'sirida doimiy tezlanish bilan harakat qilmoqda va bunda beshinchi hamda oltinchi brusoklar orasidagi taranglik kuchi 8- va 9-brusoklar orasidagi taranglik kuchidan 6 N ga ortiq. $n-1$ ni toping.

A) 8 B) 11 C) 9 D) 10

48. Yassi elektromagnit to'lqin elektr maydonining tenglamasi $E = E_0 \cos[(2 \cdot 10^4 sm^{-1})x - \omega t]$. Bu tebranishlarning davri nimaga teng? $\pi \approx 3$

A) $1/600$ ps   B) $1/600$ μs   C) $3 \cdot 10^{-6}$ s   D) 10^{-14} s