TEST SAVOLLARIDAN NAMUNALAR

1. b soni $f(x)$ funksiyaning $x \to +\infty$ dagi limiti deyiladi, agar har qanday $\varepsilon > 0$ son uchun shunday:

A) $(M; +\infty)$ oraliq topilsaki, unda $f(x) - b < \varepsilon$ tengsizlik bajarilsa;
B) $(M; +\infty)$ oraliq topilsaki, unda $|f(x) - b| < \varepsilon$ tengsizlik bajarilsa;
D) $(M; -\infty)$ oraliq topilsaki, unda $|f(x) - b| < \varepsilon$ tengsizlik bajarilsa;
E) $(M; -\infty)$ oraliq topilsaki, unda $f(x) - b < \varepsilon$ tengsizlik bajarilsa;
F) $(M; +\infty)$ oraliq topilsaki, unda $|f(x) - b| > \varepsilon$ tengsizlik bajarilsa.

2. Agar $f(x)$ va $\varphi(x)$ funksiyalar $x \to a$ da mos ravishda b va c ga teng limitlarga ega bo‘lsa, ularning $f(x) + g(x)$ yig‘indisi

A) $x \to +\infty$ da $b + c$ limitga ega bo‘ladi;
B) $x \to -\infty$ da $b + c$ limitga ega bo‘ladi;
D) $x \to \infty$ da $b + c$ limitga ega bo‘ladi;
E) $x \to a$ da $b + c$ limitga ega bo‘ladi;
F) $x \to a$ da $|b + c|$ limitga ega bo‘ladi.

3. $f(x)$ funksiya $x = a$ nuqtada uzluksiz deyiladi,

A) agar $f(x) = f(a)$ bo‘lsa;
B) agar $f(a - 0) \neq f(a + 0)$ bo‘lsa;
D) agar $\lim\limits_{x \to a} f(x) = \infty$ bo‘lsa;
E) agar $\lim\limits_{x \to a} f(x) = -f(x)$ bo‘lsa;
F) agar $f(x)$ funksiya $x = a$ nuqtada aniqlangan va $f(x) - f(a)$ ayirma $x \to a$ da cheksiz kichik bo‘lsa.

4. Agar $f(x)$ va $g(x)$ funksiyalar $x = a$ nuqtada aniqlangan bo‘lsa, u holda

A) ularning faqat yig‘indisi (ayirmasi va ko‘paytmasi emas) shu nuqtada uzluksiz bo‘lishi mumkin;
B) ularning yig‘indisi va ayirmasi (ko‘paytmasi emas) shu nuqtada uzluksiz bo‘lishi mumkin;
D) ularning yig‘indisi, ayirmasi, ko‘paytmasi ham shu nuqtada uzluksiz bo‘ladi;
E) ularning yig‘indisi, ayirmasi, ko‘paytmasi ham shu nuqtada uzluksiz bo‘lishi mumkin;
F) ularning yig‘indisi, ayirmasi, ko‘paytmasi shu nuqta yotgan oraliqda uzluksiz bo‘ladi.

5. Agar $f(x)$ va $g(x)$ funksiyalar $x = a$ nuqtada uzluksiz bo‘lsa, u holda

A) $\frac{f(x)}{g(x)}$ funksiya ham shu nuqtada uzluksiz bo‘ladi;

B) $\frac{f(x)}{g(x)}$ va $\frac{g(x)}{f(x)}$ funksiyalar ham shu nuqtada uzluksiz bo‘ladi;

D) $\frac{1}{f(x)} \cdot \frac{1}{g(x)}$ funksiya ham shu nuqtada uzluksiz bo‘ladi;

E) $g(x) \neq 0$ bo‘lganda $\frac{f(x)}{g(x)}$ funksiya ham shu nuqtada uzluksiz bo‘ladi;

F) $f(x) \neq 0$ bo‘lganda $\frac{f(x)}{g(x)}$ funksiya ham shu nuqtada uzluksiz bo‘ladi.

6. Oraliqning (intervalning) barcha nuqtalarida uzluksiz bo‘lgan funksiya

A) shu oraliqning (intervalning) ayrim nuqtalarida uzluksiz deyiladi;
B) shu oraliqning (intervalning) faqat nuqtalarida uzluksiz deyiladi;
D) shu oraliqning (intervalning) faqat o‘rtasida uzluksiz deyiladi;
E) shu oraliqda (intervalda) uzluksiz deyiladi;
F) shu oraliqning faqat ko‘rsatilgan qismida uzluksiz bo‘ladi, deyiladi.

7. Agar x radianlarda berilgan bo‘lsa, u holda $\lim\limits_{x \to 0} \frac{\sin x}{x} =$

A) 0; B) 1; D) -1; E) $-\infty$; F) $+\infty$.

8. Agar x radianlarda berilgan bo‘lsa, u holda $\lim\limits_{x \to a} \sin x =$

A) a; B) $\sin a$; D) $\frac{\sin x}{a}$; E) $a \sin x$; F) $\sin \frac{x}{2}$.

9. Agar $\alpha(x)$ o‘zgarmas funksiya $x \to +\infty$ da cheksiz kichik bo‘lsa,

A) x ning barcha qiymatlarida $\alpha(x) = 0$ bo‘ladi;
B) x ning barcha qiymatlari $\alpha(x) = +\infty$ bo‘ladi;
D) $x = 0$ da $\alpha(x) = 0$ bo‘ladi;
E) $x = 0$ da $\alpha(x) = -\infty$ bo‘ladi;
F) $x = 0$ da $\alpha(x) = 1$ bo‘ladi.

10. Agar $P(x) = a_m x^m + a_{m-1} x^{m-1} + \ldots + a_0$ va $Q(x) = b_n x^n + b_{n-1} x^{n-1} + \ldots + b_0$, $a_m \neq 0$, $b_n \neq 0$ va ko'phadlarning darajalari $m < n$ bo'lsa, u holda $\lim\limits_{x\to\infty} \frac{P(x)}{Q(x)} = \ldots$ bo'ladi.

A) $\frac{m}{n}$; B) $\frac{a_0}{b_0}$; D) $\frac{a_m}{b_n}$; E) 0; F) ∞.

11. a ning h radiusli teshilgan (o'yilgan) atrofi

A) shu nuqtaning o'zi chiqarib tashlangan atrofidan iborat;
B) $(a - h;\ a)$ va $(a;\ a + h)$ oraliqlarning birlashmasidan iborat;
D) $(-\infty;\ a)$ va $(a;\ +\infty)$ oraliqlarning birlashmasidan iborat;
E) $(-\infty; h)$ va $(h;\ +\infty)$ oraliqlarning birlashmasidan iborat;
F) $(-h;\ a)$ va $(a;\ h)$ oraliqlarning birlashmasidan iborat.

12. Agar $[a;\ b)$ yarim intervalda berilgan $f(x)$ funksiya uchun $\lim\limits_{x\to b-0} f(x) = +\infty$ bo'lsa, $x = b$ to'g'ri chiziq $f(x)$ funksiya grafigi uchun:

A) gorizontal asimptota;
B) vertikal asimptota;
D) gorizontal urinma;
E) vertikal urinma;
F) og'ma asimptota.

13. Agar f funksiya $[a;\ b]$ kesmada o'suvchi (kamayuvchi) va uzluksiz bo'lsa, u holda shu funksiyaga

A) $[a;\ b]$ kesmada (mos ravishda $[b;\ a]$ kesmada) aniqlangan f^{-1} teskari funksiya mavjud;
B) $[a;\ b]$ kesmada aniqlangan f^{-1} teskari funksiya mavjud;
D) $[f(a);\ f(b)]$ kesmada (mos ravishda $[f(b);\ f(a)]$ kesmada) aniqlangan f^{-1} teskari funksiya mavjud bo'ladi;
E) $[f(b);\ f(a)]$ kesmada (mos ravishda $[f(a);\ f(b)]$ kesmada) aniqlangan f^{-1} teskari funksiya mavjud;
F) $[f(a); f(b)]$ kesmada aniqlangan f^{-1} teskari funksiya mavjud.

14. $\lim\limits_{x\to 1} \frac{x^6 - 1}{x^3 - 1} = \ldots$

A) 0; B) 2; D) 3; E) $+\infty$; F) $-\infty$.

15. $f(x) = kx + b$ to'g'ri chiziq f funksiya grafigining $x\to\infty$ dagi og'ma asimptotasi bo'lishi uchun ... bo'lishi zarur va yetarli.

A) $k = \lim\limits_{x\to\infty} f(x)$, $b = \lim\limits_{x\to\infty} (f(x) - k)$;

B) $k = x$, $b = \lim\limits_{x\to\infty} f(x)$;

D) $k = \lim\limits_{x\to\infty} (f(x) - b),\ b = \lim\limits_{x\to\infty} (f(x) - kx)$;

D) $k = \lim\limits_{x\to\infty} \left(\frac{f(x)}{x} - b\right),\ b = \lim\limits_{x\to\infty} \frac{f(x)}{x}$;

E) $k = \lim\limits_{x\to\infty} \frac{f(x)}{x},\ b = \lim\limits_{x\to\infty} (f(x) - kx)$.

16. $f(x)$ funksiyaning $x = a$ nuqtada chapdan (shu kabi o'ngdan) uzluksiz bo'lishi uchun ... bo'lishi zarur.

A) $f(a-0) = f(0)$ (mos ravishda $f(a+0) = f(0)$);
B) $f(a-0) = 0$ (mos ravishda $f(a+0) = 0$);
C) $f(a-0) \neq f(a+0)$;
D) $f(a-0) = f(a+0)$;
E) $f(a-0) = f(a)$ (mos ravishda $f(a+0) = f(a)$).

17. Agar $f(x)$ funksiya $[a;\ b]$ kesmada uzluksiz, monoton va $f(a)f(b) < 0$ bo'lsa, funksiya shu oraliqning ... nuqtasida nolga aylanadi.

A) faqat bir;
B) tasodifan bir;
D) hech bir nuqtasida nolga aylanmaydi;
E) $f(a)f(b) > 0$ bo'lsa, bir;
F) kamida bir.

18. $y = f(x)$ funksiyada $x = x_0$ nuqtada olingan $f'(x_0)$ hosila deb

A) har qanday $\lim\limits_{\Delta x\to 0} \frac{\Delta y}{\Delta x}$ limitga aytiladi, bunda $\Delta y = f(x + \Delta x) - f(x)$ funksiya orttirmasi, Δx — argument orttirmasi;

B) $\frac{\Delta y}{\Delta x}$ nisbatga aytiladi, bunda Δy — funksiya orttirmasi, Δx — argument orttirmasi;

D) chekli $\lim\limits_{\Delta x\to 0} \frac{\Delta y}{\Delta x}$ limitga aytiladi, bunda Δy — funksiya orttirmasi, Δx — argument orttirmasi;

E) chekli $\lim\limits_{x\to\infty} (\Delta y - \Delta x)$ limitga aytiladi, bunda Δy — funksiya orttirmasi, Δx — argument orttirmasi;

F) $\lim\limits_{x\to\infty} \frac{\Delta y}{\Delta x}$ limitga aytiladi, bunda Δy — funksiya orttirmasi, Δx — argument orttirmasi.

19. Agar biror y kattalik $y = f(x)$ qonun bo'yicha o'zgarayotgan bo'lsa, bu kattalikning $x = x_0$ dagi o'zgarish oniy tezligi ... ga teng.

A) $f(x_0)$; B) $\frac{\Delta f(x_0)}{\Delta x_0}$; D) $f'(x_0)$; E) $f(x_0+\Delta x)-f(x_0)$; F) $\frac{f(x_0)}{x_0}$.

20. $A(x_0; y_0)$ nuqtada $y=f(x)$ egri chiziqqa o'tkazilgan urinmaning k burchak koeffitsiyenti ... ga teng.

A) $\frac{f(x_0)}{x_0}$; B) $f(x_0+\Delta x)-f(x_0)$; D) $f(x_0)$; E) $f'(x_0)$; F) $\frac{\Delta f(x_0)}{\Delta x_0}$.

21. Agar $f(x)$ va $g(x)$ funksiyalar $f'(x)$, $g'(x)$ hosilalari mavjud bo'lsa, u holda $(f(x) \pm g(x))' =$

A) $f'(x)\cdot g'(x)$; B) $f'(x)\pm g'(x)$; D) $f'(x\pm y)$; E) $g'(x\pm y)$; F) $f(x)\pm g(x)$.

22. Agar $f'(x)$ va $g'(x)$ hosilalar mavjud bo'lsa, $(f(x)g(x))' =$

A) $f'(x)g'(x)$;
B) $f'(x)g'(x) + C$, C — o'zgarmas;
D) $f'(x)f(x) + g'(x)g(x)$;
E) $f'(x)g(x) + g'(x)f(x)$;
F) $f'(x)g'(x) + f(x)g(x)$.

23. Agar $f'(x)$ va $g'(x)$ hosilalar mavjud va $g(x)\neq 0$ bo'lsa, $\left(\frac{f(x)}{g(x)}\right)' =$

A) $\frac{f'(x)}{g'(x)}$;
B) $\frac{f'(x)}{g(x)}$;
D) $\frac{f'(x)g(x)-f(x)g'(x)}{g^2(x)}$;
E) $\frac{f'(x)g(x)-f(x)g'(x)}{g(x)}$;
F) $\frac{f'(x)g(x)+f(x)g'(x)}{g^2(x)}$.

24. Berilgan $f(x) = x^a$, $a\in R$ funksiyaning $f'(x)$ hosilasi ifodasini ko'rsating:

A) $a\cdot x^a$; B) 1; D) 0; E) $a\cdot x^{a-1}$; F) $f''(x)$.

25. $f(x)$ funksiyalarning $f'(x)$ hosilalari ifodasini ko'rsating:

$f(x) =$	$f'(x) =$
1) $\sin x$; 2) $\cos x$;	K) $\sin x$; L) $-\sin x$; M) $\cos x$;
3) $\operatorname{tg} x$; 4) $\operatorname{ctg} x$;	N) $-\frac{1}{\cos^2 x}$; P) $\frac{1}{\cos^2 x}$; Q) $-\frac{1}{\sin^2 x}$.

A) 1K, 4P, 3M, 2N;
B) 1M, 4Q, 3P, 2L;
D) 2L, 4K, 3Q, 1N;
E) 3R, 4K, 2M, 1Q;
F) 4Q, 3N, 2K, 1L.

26. $f(x)$ funksiyalarning $f'(x)$ hosilalari ifodasini ko'rsating:

$f(x) =$	$f'(x) =$
1) e^x; 2) a^x $(a>0,\ a\neq 1)$;	K) $\frac{1}{x\ln a}$; L) e^x; M) $\ln a^x$;

3) $\ln x$ $(x > 0)$; 4) $\log_a x$ $(a > 0,\ a \neq 1,\ x > 0)$;	N) $a^x \ln a$; P) $\frac{1}{a}\log_a x$; Q) $\frac{1}{x}$.

A) 1K, 2P, 3M, 4Q; B) 1M, 2Q, 3P, 4N;
D) 1L, 2N, 3Q, 4K; E) 1N, 2M, 3K, 4L;
F) 1Q, 2K, 3M, 4N.

27. $f(x)$ funksiyalarning $f'(x)$ hosilalari ifodasini ko‘rsating:

$f(x) =$	$f'(x) =$
1) arcsin$x$; 2) arccos$x$;	K) $\frac{1}{1-x^2}$; L) $\frac{1}{\sqrt{1-x^2}}$; M) $\frac{1}{\sqrt{1+x^2}}$;
3) arctg$x$; 4) arcctg$x$;	N) $-\frac{1}{\sqrt{1-x^2}}$; P) $-\frac{1}{1+x^2}$; Q) $\frac{1}{1+x}$.

A) 1L, 2N, 3Q, 4P; B) 1K, 2Q, 3M, 4N;
D) 1M, 2K, 3P, 4Q; E) 1N, 2P, 3M, 4Q;
F) 1Q, 2L, 3K, 4M.

28. Agar $u = \varphi(x)$, $y = f(u)$ bo‘lsa va $\varphi'(x)$, $f'(u)$ hosilalar mavjud bo‘lsa, u holda $y = f(\varphi(x))$ murakkab funksiya hosilasi y'=... bo‘ladi.

A) $\frac{dy}{dx} = \frac{f'(x)}{\varphi(x)}$; B) $\frac{dy}{dx} = f'(\varphi'(x))$; D) $\frac{dy}{dx} = f'(u)\psi(x)$;

E) $\frac{dy}{dx} = f'(u)\varphi'(x)$; F) $\frac{dy}{dx} = f'(\varphi(u)\psi(x))$.

29. Agar $y = f(u)$, $u = \varphi(t)$, $t = \psi(x)$ bo‘lsa, y'_x =... bo‘ladi.

A) $\frac{dy}{dx} = \frac{f'(u)}{\varphi(t)\psi(x)}$; B) $\frac{dy}{dx} = f'(\varphi'(t)\psi'(x))$;

C) $\frac{dy}{dx} = f'(u)\varphi'(x)\psi'(x)$; D) $\frac{dy}{dx} = f(\varphi(\psi'(x)))$;

E) $\frac{dy}{dx} = f'(\varphi(t)\psi(x))$.

30. Agar $y = f(x)$ va $x = \varphi(y)$ o‘zaro teskari funksiyalar hosilalari mavjud va $f'(x) \neq 0$ bo‘lsa, u holda $\varphi'(y)$ = ... bo‘ladi.

A) $\frac{f(x)}{\varphi'(y)}$; B) $\frac{f'(x)}{x}$; D) $\frac{x}{f'(x)}$; E) $\frac{1}{\varphi'(y)}$; F) $f'(x)$.

31. Agar $(a; b)$ intervalda uzluksiz bo‘lgan $f(x)$ funksiyaning $f'(x)$ hosilasi shu intervalda musbat bo‘lsa, funksiya unda ... .

A) kamaymaydi; B) o‘sadi; D) kamayadi;
E) o‘smaydi; F) monoton emas.

32. Differensiallanuvchi funksiya $x = c$ nuqtada ekstremumga ega bo‘lishi uchun $f'(c) = 0$ bo‘lishi ... .

A) yetarli; B) zarur va yetarli; D) zarur;
E) yetarli, lekin zaruriy emas; F) shart emas.

33. Funksiya hosilasi mavjud bo‘lmagan nuqtada funksiya ekstremumga ...

A) ega bo‘lmaydi; B) har vaqt ega bo‘ladi;
D) faqat minimumga ega bo‘ladi; E) ega bo‘lishi mumkin;
F) faqat maksimumga ega bo‘ladi.

34. $f(x)$ funksiya $c \in (a;\ b)$ nuqtada hosilaga ega bo‘lsin. Agar $f'(c) = 0$ va c nuqtadan chapda $f' > 0$, nuqtadan o‘ng tomonda $f' < 0$ bo‘lsa, funksiya $x = c$ nuqtada ... ga erishadi.

A) lokal minimum;
B) maksimum yoki minimum ;
D) lokal maksimum;
E) intervaldagi eng kichik qiymat;
F) intervaldagi eng katta qiymat.

35. $f''(x)$ hosila $x = c$ nuqtada 0ga teng. Bu nuqta $f(x)$ funksiya uchun qanday nuqtadan iborat?

A) minimum; B) bukilish; D) maksimum;
E) ekstremum; F) uzilish.

36. Lagranj teoremasi: agar $f(x)$ funksiya $[a;\ b]$ kesmada uzluksiz va oraliqning ichki nuqtalarida differensiallansa, bu kesmada shunday $x = s$ nuqta topiladiki, unda ... tenglik o‘rinli bo‘ladi.

A) $\frac{f(b)-f(a)}{b-a} = f'(c)$; B) $\frac{f(b)+f(a)}{b+a} = f'(c)$;

C) $(f(b) - f(a))(b - a) = f'(c)$; D) $\frac{f(x)-f(b)}{f(b)-f(a)} = f'(c)$;

E) $\frac{f(x)+f(b)}{x+a} = f'(c)$.

37. Agar $[a;\ b]$ kesmada $f(x)$ funksiya uzluksiz va $f'' > 0$ bo‘lsa, funksiya grafigi qavariqligi bilan ... qaragan bo‘ladi.

A) yuqoriga; B) o‘ngga; D) pastga; E) har tomonga; F) chapga.

38. $(x+a)^n$ Nyuton binomi yoyilmasidagi $(k+1)$- hadi ... ko‘rinishda bo‘ladi.

A) $C_n^k x^n a^k$; B) $C_{n-k}^k x^{n-k} a^n$; D) $C_{n+k}^k x^k a^{n-k}$;

E) $C_n^k x^{n-k} a^k$; F) $C_{n+k}^{n-k} x^n a^k$.

39. Har qaysi $f(x)$ funksiyaning $F(x)$ boshlang'ich funksiyasini ko'rsating:

$f(x) =$	$F(x) =$
A) $\sqrt{3x-2}$; B) $\frac{2}{\sqrt{3x-2}}$, $x > \frac{2}{3}$	K) $\frac{3x^2}{\sqrt{3x-2}}$; L) $\frac{2}{9}\sqrt{(3x-2)^3}$;
	P) $\frac{2}{3}\sqrt{3x-2}$; N) $(3x-2)\sqrt{3x-2}$;

1) AK, BL; 2) AP, BK; 3) AL, BP; 4) AN, BP; 5) AL, BN.

40. $\int f(x)dx = F(x)+C$, $C\in R$ bo'yicha har qaysi $f(x)$ funksiyaga qaysi $F(x)$ funksiya mos?

$f(x) =$	$F(x) =$
K) $\frac{1}{1+x^2}$; L) $\cos x$; M) $\frac{1}{\sin^2 x}$	A) $\frac{(1+x^2)^2}{2}$; B) $\sin x$;
	D) $-\sin x$; E) $-\mathrm{tg}x$; F) $-\mathrm{ctg}x$;
	G) $\mathrm{arctg}x$; H) $\arcsin x$.

1) KA, LD, ME; 2) KG, LB, MF; 3) KA, LF, MG;
4) KE, LG, MH; 5) KD, LB, MB.

41. $\int\left(2x^2-\frac{1}{x^2}\right)dx$ integralni toping:

A) $x^3-\mathrm{arctg}(x-1)+C$; B) $\frac{2x^2-\frac{1}{x^2}}{2}+C$;

D) $2x^3-\ln x^2+C$; E) $\frac{2x^3}{3}+\frac{1}{x}+C$;

F) $2x^3-2\ln x+C$.

42. $\int\frac{10\sin^2 x-4\cos^2 x}{\sin^2 x\cos^2 x}dx$ integralni hisoblang.

A) $10\mathrm{tg}x+4\mathrm{ctg}x+C$; B) $6\mathrm{tg}x-8\sin 2x+C$;

D) $-\frac{10}{\cos x}+\frac{1}{\sin x}+C$; E) $10\ln(\cos^2 x)-\frac{1}{\sin x}+C$;

F) $6\mathrm{ctg}x-8\cos 2x+C$.

43. O‘zgaruvchini almashtirishdan foydalanib hisoblang:

$$J=\int\frac{\operatorname{ctg}^3 4x dx}{\sin^2 4x} \text{ va } K=\int\frac{dx}{x\ln x}.$$

A) $J=\frac{\operatorname{tg}^4 4x}{16},\ K=x^{\ln x}$; B) $J=-\frac{\operatorname{ctg}4x}{16}+C,\ K=\ln(\ln x)+C$;

D) $J=\cos 4x,\ K=\frac{1}{\ln x}$; E) $J=\sin 4x,\ K=e^{-x}$;

F) $J=\operatorname{tg}4x,\ K=\ln^2 x$.

44. O‘zgaruvchilarni ajratishdan foydalanib, $y'=x^3y^3$ differensial tenglamaning $y(1)=-4$ boshlang‘ich shartni qanoatlantiruvchi yechimini toping.

A) $16x^3$; B) $-4x^4$; D) $-4x^{-4}$; E) $-16x^3$; F) $-16x^{-3}$.

45. $S_1=\int\limits_0^2 x^2\sqrt{1+x^2}\,dx-?$ $S_2=\int\limits_0^2\frac{xdx}{\sqrt{1-x^4}}-?$

A) $S_1=\frac{9}{52},\ S_2=2\arcsin 2$; B) $S_1=52,\ S_2=\arccos 4$;

D) $S_1=\frac{26}{9},\ S_2=2\arccos 4$; E) $S_1=\frac{54}{9},\ S_2=\sqrt{1-x^4}$;

F) $S_1=\frac{52}{9},\ S_2=\frac{1}{2}\arcsin 4$.

46. $\lim\limits_{x\to+\infty}\left(\frac{3x+15}{3x+1}\right)^{x-1}$ ni hisoblang.

A) 15; B) $e^{\frac{14}{3}}$; D) $\frac{\infty}{\infty}$; E) e^{15}; F) 1.

47. Bir aylanada yotgan besh nuqta ustidan qancha vatar o‘tkazish mumkin?

A) C_5^2; B) A_5^2; D) P_5; E) $\overline{A}_5^2$; F) $\overline{C}_5^2$.

48. Cheksiz kamayuvchi geometrik progressiyada:

$$S=\frac{3}{4},\ a_1=-\frac{1}{3};\ a_n-?$$

A) $\frac{5^{n-1}}{3^{2n-1}}$; B) $\frac{9}{56}$; D) $\frac{1}{91}$; E) $\frac{3^2}{5}$; F) 0.

49. $y=x^3-3x$ chiziq va uning $x_0=-1$ abssissali nuqtadagi urinmasi bilan chegaralangan shaklning yuzini toping.

A) 5,25; B) 6,75; D) 6,25; E) 4,75; F) 5,75.

50. I integraldan har biri qaysi K ifodaga tengligini va ... nuqtalar o‘rnida turgan ifodani ko‘rsating.

I: A) $\int_a^b f(x)dx$; B) $\int_b^b f(x)dx$;

D) $\int_c^d f(x)dx = ... + \int_e^d f(x)dx$; E) $\int_a^b [f(x)+q(x)]dx$;

K: 1) $-\int_a^b f(x)dx$; 2) $\int_c^e f(x)dx$; 3) $-\int_a^b f(x)dx$; 4) 0;

5) $\int_a^b f(x)dx + \int_a^b q(x)dx$; 6) $\int_a^b f(x)dx - \int_a^b q(x)dx$;

7) $\int_c^{d-e} f(x)dx$; 8) $\int_b^{2b} f(x)dx$; 9) C; 10) $\int_{2a}^{2b} f(x)dx$.

A) A3, B1, D7, E4; B) A1, B4, D2, E5;
D) A5, B8, D6, E9; E) A10, B9, D4, E6;
F) A8, B6, D9, E10.

51. Agar $[a;\ b]$ kesmada $f(x) \geq 0$ funksiya uchun $k \leq f(x) \leq K$ tengsizlik o‘rinli bo‘lsa, $?(b-a) \leq \int_a^b f(x)dx \leq K\,?$ bo‘ladi. ? belgilar o‘rniga mos ifodalarni tartibi bo‘yicha yozing:

A) $(k-a)$, $(k-b)$; B) $(K-k)$, $(K+k)$; D) k, $(b-a)$;
E) $(k-b)$, $(k+b)$; F) $(K-a)$, $(k+b)$.

52. $f(x)$ funksiya $[a;\ b]$ kesmada monoton o‘suvchi. Agar $[a;\ b]$ kesma teng n bo‘lakka bo‘lingan va bo‘linish nuqtalari $a=x_0<x_1<...<x_n=b$ bo‘lsa, u holda

$$\frac{?}{n}\sum_{k=0}^{n-1} ? \leq \int_a^b f(x)dx \leq \frac{?}{?}\sum_{k=1}^{n} ?$$

bo‘ladi. ? belgilari o‘rniga mos ifodalarni tartibi bilan yozing.

A) x_n, $f(x)$, x_{n-1}, $n-1$, x_k; B) x_0, x_k, x_n, $n-2$, $f(x_{k-1})$;
D) $b+a$, $f(x_{k-1})$, $b+a$, $n-1$, $f(x_{k-1})$; E) $b-a$, $f(x_k)$, $b-a$, n, $f(x_k)$;

F) $x_n - x_{n-1}$, $f(x_{k-2})$, $x_n - x_{n-1}$, 2, $f(x_{k-2})$.

53. Trapetsiyalar formulasi:

$$\int_a^b f(x)dx \approx \frac{?}{n}\left(\frac{f(a)+f(?)}{2}+f(x_1)+...+f(?)\right)$$

? belgilar o'rniga mos ifodalarni kelish tartibida yozing.

A) $b - a$, b, x_{n-1}; B) $b + a$, na, x_n; D) ab, x_{n-1}, x_{n-2};

E) $\sqrt{ab}$, $b - a$, nx_0; F) $\sqrt{\frac{b}{a}}$, nb, nx.

54. $x > 0$, $a > 0$ uchun

Topilsin:	Javob variantlari:				
	(1)	(2)	(3)	(4)	(5)
$(\ln(ax))'$	$\frac{1}{ax}$	$\frac{1}{x}$	$\frac{a}{x}$	$\ln a + \ln x$	e^{ax}
$x = \frac{1}{e^2}$ да $\ln x$	2	–2	e^2	e^{-2}	1
$\lim\limits_{x\to+\infty} \ln x$	0	$+\infty$	$-\infty$	1	e
$\lim\limits_{x\to+0} \ln x$	$+\infty$	$-\infty$	–1	e	0

55. $a > 0$, $b > 0$ uchun:

Topilsin:	Javob variantlari:				
	(1)	(2)	(3)	(4)	(5)
$a^x \cdot a^y$	a^{xy}	$a^x + a^y$	a^{x+y}	a^{x-y}	$a^x \cdot y$
$\frac{a^x}{a^y}$	$a^{\frac{x}{y}}$	$a^x - a^y$	a^{x-y}	$\sqrt[y]{a^x}$	$\frac{a^x}{y}$
$(a^x)^y$	$a^x \cdot y$	a^{x+y}	a^{xy}	$\sqrt[x]{a^y}$	$(a^x)^{a^y}$
$(ab)^x$	$a^x + b^x$	ab^x	$a^x b^x$	$a^x b$	$(a+b)^x$
$\left(\frac{a}{b}\right)^x$	$a^x - b^x$	$\frac{a}{b^x}$	$\frac{a^x}{b^x}$	$\frac{a^x}{b}$	$(a-b)^x$

56. Kombinatorika elementlari:

Asosiy formulalar	Javob variantlari:				
	(1)	(2)	(3)	(4)	(5)
$\bar{A}_m^k =$	$(m!)^k =$	$m \cdot k$	$m! \cdot k!$	k^m	m^k
$A_m^k =$	$\frac{k!}{m!}$	$\frac{m!}{k!}$	$\frac{(m-k)!}{(m+k)!}$	$\frac{(m+k)!}{(m-k)!}$	$\frac{m!}{(m-k)!}$

$P_m =$	$m!(m-1)!...1!$	$(m-1)!$	$(m+1)!$	$m(m-1)$	$m!$
$C_m^k =$	$\frac{k!}{(m+k)!}$	$\frac{k+1}{m!}$	$\frac{k-1}{m!}$	$\frac{(m+1)!}{m!(m+k)!}$	$\frac{k!}{k!(m-k)!}$
$k=k_1+...+k_m$. $P(k_1,k_2,...k_m)=$	$k!$	$\frac{(k+1)!}{k_1!k_2!...k_m!}$	$\frac{k}{k_1!k_2!...k_m!}$	$\frac{k+1}{k_1!k_2!...k_m!}$	$\frac{k!}{k_1!k_2!...k_m!}$
$\bar{C}_m^k =$	C_{m+1}^{k+1}	C_{k-m+1}^{k-1}	C_{k+m}^{k-1}	C_{k-m-1}^{k+1}	C_{k+m-1}^{k}

57. Ehtimollik nazariyasi elementlari:

Qo‘shish teoremalari	Javob variantlari:				
	(1)	(2)	(3)	(4)	(5)
$A \cup B = \varnothing$ uchun $P(A \cup B) =$	$P(A) \cup P(B)$	$P(A) + P(B)$	$P(A) - P(B)$	$P(A) \cap P(B)$	$P(A - B)$
$P(\bar{A}) =$	$\overline{P(A)}$	$1 - P(A)$	$1 + P(\bar{A})$	$1 - P(\bar{A})$	$1 + P(A)$

58. Bitta ehtimollik fazosidan olingan erkli A va B tasodifiy hodisalar uchun:

	Javob variantlari:				
	(1)	(2)	(3)	(4)	(5)
$P(A \cap B) =$	$P(A) \cdot P(B)$	$P(A) + P(B)$	$P(\bar{A} \cap B)$	$P(A \cap \bar{B})$	$P(\bar{A} \cap \bar{B})$
$P(A \cap B) =$	$P(A) + P(B) - P(A) \cdot P(B)$	$P(A + B) - P(A) \cdot P(B)$	$P(A + B) + P(A) \cdot P(B)$	$P(A) + P(B) + P(A) \cdot P(B)$	$P(A) - P(B) + P(A) \cdot P(A)$

59. X hodisa ro‘y bergandagina A hodisaning ro‘y berish ehtimolligi $P(A|X) =$

A) $\frac{P(A \cup X)}{P(X)}$; B) $\frac{P(A \cap X)}{P(X)}$; D) $\frac{P(A \cup X)}{P(A)}$;

E) $\frac{P(A \cap X)}{P(A)}$; F) $\frac{P(X)}{P(A \cap X)}$.

60. Bernulli formulasi $P_{m,n} =$

A) $C_m^n p^m q^{m-n}$; B) $C_m^n p^n q^{m-n}$; D) $C_m^n p^{m-n} q^n$;

E) $C_n^m p^{n-m} q^n$; F) $C_n^m p^m q^{n-m}$.