"TASDIQLAYMAN"
Chirchiq davlat pedagogika universiteti
Aniq fanlar fakulteti dekani
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"__" _____ 2026-yil

Aniq fanlar fakulteti Algebra va matematik analiz kafedrasi 2026-2027 o'quv yili Amaliy matematika yo'nalishi 2-kurs talabalari uchun matematik analiz fanidan oraliq nazorat savollari ro'yxati.

1. Ko'p o'zgaruvchili funksiyalar.
2. Ko'p o'zgaruvchili funksiyaning limiti.
3. Ko'p o'zgaruvchili uzluksiz funksiyalar. Ko'p o'zgaruvchili uzluksiz funksiyaning tekis uzluksizligi.
4. Ko'p o'zgaruvchili funksiyalarni differensiallash.
5. Ko'p o'zgaruvchili funksiya differensialining taqribiy hisoblashlarga tadbiqlari.
6. Ko'p o'zgaruvchili funksiyaning yuqori tartibli hosila va differensiallari.
7. Oshkormas funksiyalarni differensiallash.
8. Ko'p o'zgaruvchili funksiyaning ekstremumlari.
9. Ko'p o'zgaruvchili funksiyaning eng katta va eng kichik qiymatlari. Yo'nalish bo'yicha hosila.
10. Ikki o'lchovli integrallar.
11. Ikki o'lchovli integrallarni hisoblash.
12. Ikki o'lchovli integrallarda o'zgaruvchilarni almashtirish.
13. Ikki o'lchovli integrallarning tatbiqlari.
14. Uch o'lchovli integrallar.
15. Uch o'lchovli integrallarni hisoblash

Amaliy mashg'ulot savollari

$\mathbb{R}^n$ fazoda ketma-ketlik

1. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1}{n^2}+\frac{2}{n^2}+...+\frac{n-1}{n^2};\left(\frac{2n^2+2}{2n^2+1}\right)^{n^2}\right)$ ketma-ketlikning limitini toping.

2. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{2n+1\,!+\,2n+2\,!}{2n+3\,!};\left(\frac{n-1}{n+3}\right)^{n+2}\right)$ ketma-ketlikning limitini toping.

3. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{2^{n+1}+3^{n+1}}{2^n+3^n};\left(\frac{n^2-1}{n^2}\right)^{n^4}\right)$ ketma-ketlikning limitini toping.

4. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1+2+...+n}{\sqrt{9n^4+1}};\left(\frac{2n+3}{2n+1}\right)^{n+1}\right)$ ketma-ketlikning limitini toping.

5. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1+4+7+...+\,3n-2}{\sqrt{5n^4+n+1}};\left(\frac{n+1}{n-1}\right)^{n}\right)$ ketma-ketlikning limitini toping.

6. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{n+4\,!-\,n+2\,!}{n+3\,!};\left(\frac{n+3}{n+5}\right)^{n+4}\right)$ ketma-ketlikning limitini toping.

7. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{\sqrt[3]{n^3+5}-\sqrt{3n^4+2}}{1+3+5+...+\,2n-1};\left(\frac{n^3+1}{n^3-1}\right)^{2n-n^3}\right)$ ketma-ketlikning limitini toping.

8. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{3}{4}+\frac{5}{16}+\frac{9}{64}...+\frac{1+2^n}{4^n};n\sqrt[3]{5+8n^3}-2n\right)$ ketma-ketlikning limitini toping.

9. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1}{1\cdot 2}+\frac{1}{2\cdot 3}+...+\frac{1}{n\ n+1};\sqrt{2}\cdot\sqrt[4]{2}\cdot\sqrt[8]{2}\cdot....\cdot\sqrt[2^n]{2}\right)$ ketma-ketlikning limitini toping.

10. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1}{n^2}+\frac{2}{n^2}+...+\frac{n-1}{n^2};\left(\frac{2n^3+1}{2n^3+2}\right)^{n^3}\right)$ ketma-ketlikning limitini toping.

11. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1}{n^2}+\frac{2}{n^2}+...+\frac{n-1}{n^2};\left(\frac{4n^2-3}{4n^2-2}\right)^{n^2}\right)$ ketma-ketlikning limitini toping.

12. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{4^{n+1}+3^{n+1}}{4^n+3^n}; \left(\frac{2n^2-1}{2n^2} \right)^{n^4} \right)$ ketma-ketlikning limitini toping.

13. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{n+3\,!-\,n+1\,!}{n+2\,!}; \left(\frac{3n+3}{3n+5} \right)^{n+4} \right)$ ketma-ketlikning limitini toping.

14. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{3}{4}+\frac{5}{16}+\frac{9}{64}...+\frac{1+2^n}{4^n}; n\sqrt[3]{3+27n^3}-3n \right)$ ketma-ketlikning limitini toping.

15. $\mathbb{R}^2$ fazoda $x^n = \left(\frac{1+2+...+n}{\sqrt{5n^4+1}}; \left(\frac{3n+3}{3n+1} \right)^{n+4} \right)$ ketma-ketlikning limitini toping.

Ko‘p o‘zgaruvchili funksiyalar

16. $u = \arccos\frac{x}{x+y}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

17. $u = \ln\, xyz$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

18. $u = \ln\, -x-y$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

19. $u = \arcsin\frac{y}{x}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

20. $u = \sqrt{\sin\, x^2+y^2}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

21. $u = \sqrt{1-\, x^2+y^{\,2}}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

22. $u = \sqrt{\frac{x^2+y^2-x}{2x-x^2-y^2}}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

23. $u = \sqrt{x^2+y^2-1\;\; 4-x^2-y^2}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

24. $u = \sqrt{1-x^2}+\sqrt{y^2-1}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

25. $u = \sqrt{\frac{x^2+2x+y^2}{x^2-2x+y^2}}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

26. $u = \arccos\frac{z}{\sqrt{x^2+y^2}}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

27. $u = \frac{\sqrt{4x-y^2}}{\ln\, 1-x^2-y^2}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

28. $u = \operatorname{arc}tg\frac{x-y}{1+x^2y^2}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

29. $u = \sqrt{x-\sqrt{y}}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

30. $u = \sqrt{x\cos y}$ funksiyaning aniqlanish sohasini toping va uni tasvirlang.

Karrali limitlar

31. $\lim\limits_{\substack{x\to 0\\ y\to 0}} \dfrac{\sin xy}{\sqrt{x^2+y^2}}$ ni hisoblang.

32. $\lim\limits_{\substack{x\to\infty\\ y\to\infty}} \dfrac{x+y}{x^2-xy+y^2}$ ni hisoblang.

33. $\lim\limits_{\substack{x\to\infty\\ y\to 3}} \left(1+\dfrac{1}{x}\right)^{\frac{x^2}{x+y}}$ ni hisoblang.

34. $\lim\limits_{\substack{x\to+\infty\\ y\to+\infty}} \left(\dfrac{xy}{x^2+y^2}\right)^{x^2}$ ni hisoblang.

35. $\lim\limits_{\substack{x\to\infty\\ y\to\infty}} \dfrac{x^2+y^2}{x^4+y^4}$ ni hisoblang.

36. $\lim\limits_{\substack{x\to 0\\ y\to 0}} x^2+y^2\ ^{x^2y^2}$ ni hisoblang.

37. $\lim\limits_{\substack{x\to\infty\\ y\to 0}} \left(1+\dfrac{2}{x}\right)^{\frac{x^2}{x+y}}$ ni hisoblang.

38. $\lim\limits_{\substack{x\to+\infty\\ y\to+\infty}} x^2+y^2\ e^{-x+y}$ ni hisoblang.

39. $\lim\limits_{\substack{x\to 1\\ y\to 0}} \dfrac{\ln x+e^y}{\sqrt{x^2+y^2}}$ ni hisoblang.

40. $\lim\limits_{\substack{x\to 0\\ y\to 0}} \dfrac{\sin x^4y^2}{x^2+y^{2\ 2}}$ ni hisoblang.

41. $\lim\limits_{\substack{x\to 0\\ y\to 0}} \dfrac{e^{-\frac{1}{x^4+y^4}}}{x^4+y^4}$ ni hisoblang.

42. $\lim\limits_{\substack{x\to 0\\ y\to 0}} 1+x^2y^{2\ \frac{1}{x^2+y^2}}$ ni hisoblang.

43. $\lim\limits_{\substack{x\to 0\\ y\to 0}} 1+x^2+y^{2\ \frac{1}{x^2+y^2}}$ ni hisoblang.

44. $\lim\limits_{\substack{x\to 0\\ y\to 0}} \dfrac{\sqrt[3]{x^4y^2}}{x^2+y^2}$ ni hisoblang.

45. $\lim\limits_{\substack{x\to\infty\\ y\to\infty}} x^2+y^2\ \sin\dfrac{1}{x^2+y^2}$ ni hisoblang.

Xususiy hosilalar va differensiallar

Quyida berilgan $z = f(x, y)$ funksiyaning ikkinchi tartibli xususiy hosilalari va differensialini toping.

74. $z = x \cdot \ln(x^2 + y^2)$

75. $z = y \cdot e^{x \cdot y}$

76. $z = \ln(\sin(x + y))$

77. $z = \arcsin\dfrac{x+y}{x}$

78. $z = \operatorname{arctg}\dfrac{x}{y}$

79. $z = y^2 \ln(x + y)$

80. $z = x^3 - \ln(x^2 - 3xy)$

81. $z = tg(e^{xy})$

82. $z = y \cdot tg(x + y)$

83. $z = \sqrt{x^2 + 2 \cdot x \cdot y}$

84. $z = 3x^2 y + \ln^2 \dfrac{x}{y}$

85. $z = xtg(x^2 + 3y)$

86. $z = \cos x \cdot \cos y$

87. $z = x^2 y + \cos(x + y)$

Ikki karrali integralni hisoblang.

88. $\iint\limits_D (12x^2y^2 + 16x^3y^3)dxdy;\ D: x = 1,\ y = x^2,\ y = -\sqrt{x}.$

89. $\iint\limits_D (9x^2y^2 + 48x^3y^3)dxdy;\ D: x = 1, y = \sqrt{x},\ y = -x^2.$

90. $\iint\limits_D (36x^2y^2 - 96x^3y^3)dxdy;\ D: x = 1,\ y = \sqrt[3]{x}, y = -x^3.$

91. $\iint\limits_D (18x^2y^2 + 32x^3y^3)dxdy;\ D: x = 1, y = x^3, y = -\sqrt[3]{x}.$

92. $\iint\limits_D (27x^2y^2 + 48x^3y^3)dxdy;\ D: x = 1, y = x^2, y = -\sqrt[3]{x}.$

93. $\iint\limits_D (18x^2y^2 + 32x^3y^3)dxdy;\ D: x = 1,\ y = \sqrt[3]{x},\ y = -x^2.$

94. $\iint\limits_D (18x^2y^2 + 32x^3y^3)dxdy;\ D: x = 1, y = x^3,\ y = -\sqrt{x}.$

95. $\iint\limits_D \left(27x^2y^2 + 48x^3y^3\right)dxdy;\ D: x=1,\ y=\sqrt{x},\ y=-x^3.$

96. $\iint\limits_D \left(4xy + 3x^2y^2\right)dxdy;\ D: x=1,\ y=x^2,\ y=-\sqrt{x}.$

97. $\iint\limits_D \left(12xy + 9x^2y^2\right)dxdy;\ D: x=1, y=\sqrt{x},\ y=-x^2.$

98. $\iint\limits_D \left(8xy + 9x^2y^2\right)dxdy;\ D: x=1, y=\sqrt[3]{x},\ y=-x^3.$

99. $\iint\limits_D \left(24xy + 18x^2y^2\right)dxdy;\ D: x=1,\ y=x^3,\ y=-\sqrt[3]{x}.$

100. $\iint\limits_D \left(12xy + 27x^2y^2\right)dxdy;\ D: x=1,\ y=x^2,\ y=-\sqrt[3]{x}.$

Oraliq nazorat savollari Algebra va matematik analiz kafedrasi 2026-yil ___-_____dagi ___-yig'ilishida muhokama qilingan ___-sonli bayonnoma

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