Integral hisob

1.Integralni toping: $\int \sin 5x\, dx$
$-\frac{1}{5}\cos 5x$
$\frac{1}{5}\cos 5x$
$-\frac{1}{5}\sin 5x$
$\frac{1}{5}\sin 5x$

2. Integralni toping: $\int 2^{5x}\, dx$
$\frac{1}{5\ln 2}\cdot 2^{5x}$
$\frac{1}{2\ln 5}\cdot 2^{5x}$
$\frac{1}{5\ln 5}\cdot 2^{5x}$
$\frac{2}{\ln 5}2^{5x}$

3.Integralni toping: $\int \frac{1}{\cos^2 3x}\, dx$
$\frac{1}{3}tg3x$
$3tg3x$
$-3tg3x$
$tg3x$

4.Integralni toping: $\int \frac{dx}{1+4x^2}$
$\frac{1}{2}arctg2x$
$-arctg2x$
$arctg2x$
$-\frac{1}{2}arctg2x$

5.Integralni toping: $\int \frac{dx}{\sqrt{1-4x^2}}$
$\frac{1}{2}\arcsin 2x$

$-\frac{1}{2}\arcsin 2x$
$\arcsin 2x$
$-\arcsin 2x$

6.Integralni toping: $\int \frac{dx}{5x-1}$
$\frac{1}{5}\ln\lvert 5x-1\rvert$
$-\ln\lvert 5x-1\rvert$
$-\frac{1}{5}\ln\lvert 5x-1\rvert$
$\ln\lvert 5x-1\rvert$

7.Integralni toping: $\int \frac{xdx}{x^2-1}$
$\frac{1}{2}\ln\lvert x^2-1\rvert$
$-\ln\lvert x^2-1\rvert$
$-\frac{1}{2}\ln\lvert x^2-1\rvert$
$\ln\lvert x^2-1\rvert$

8.Integralni toping: $\int \frac{6xdx}{x^2+5}$
$3\ln\lvert x^2+5\rvert$
$-6\ln\lvert x^2+5\rvert$
$6\ln\lvert x^2+5\rvert$
$-3\ln\lvert x^2+5\rvert$

9.Integralni toping: $\int x\ln xdx$
$\frac{x^2}{4}(2\ln x-1)+C$
$-\frac{x^2}{4}(2\ln x-1)+C$
$\frac{x^2}{4}(\ln x-1)+C$
$\frac{x^2}{4}(2\ln x+1)+C$

10.Integralni toping: $\int \sin\sqrt{x}dx$
$-2\sqrt{x}\cos\sqrt{x}+$ $+2\sin\sqrt{x}+C$
$2\sqrt{x}\cos\sqrt{x}+$ $+2\sin\sqrt{x}+C$
$-2\sqrt{x}\sin\sqrt{x}+$ $+2\cos\sqrt{x}+C$
$\sqrt{x}\cos\sqrt{x}+$ $+\sin\sqrt{x}+C$

11. Integralni toping: $\int \frac{xdx}{x^4+1}$.
$\frac{1}{2}arctgx^2+C$
$arctg\frac{x}{4}+C$
$arctg4x+C$
$\frac{1}{2}arctg^2x+C$

12.Integralni toping: $\int \frac{dx}{x^2+6x+25}$.
$\frac{1}{4}arctg\frac{x+3}{4}+C$
$-\frac{1}{4}arctg\frac{x-3}{4}+C$
$\frac{1}{4}arctg\frac{x-3}{4}+C$
$-\frac{1}{4}arctg\frac{x+3}{4}+C$

13.Integralni toping: $\int \frac{x-1,5}{x^2-3x+2}dx$
$\frac{1}{2}\ln(x^2-3x+2)+C$
$\ln(x^2-3x+2)+C$
$x^2-\frac{3}{4}x+C$
$\ln(x-1,5)+C$

14.Integralni toping: $\int \frac{\ln x}{x}dx$

$\frac{\ln^2 x}{2}+C$
$\ln(\ln x)+C$
$x\ln x+C$
$\frac{\ln x-x}{x^2}+C$

15.Integralni toping: $\int \sin^2 x\cos x dx$
$\frac{\sin^3 x}{3}+C$
$\frac{\cos^2 x}{3}+C$
$\frac{\sin^2 x}{3}+C$
$\frac{\cos^3 x}{3}+C$

16. $\int_{\pi/6}^{\pi/3}\frac{tgx}{\sin 2x}dx$ ni hisoblang
$\frac{1}{\sqrt{3}}$
$\frac{1}{\sqrt{2}}$
1
$\sqrt{3}$

17. $\int_1^2 \frac{dx}{x^2+x}$ ni hisoblang
$\ln\frac{4}{3}$
$-\ln\frac{4}{3}$
$\ln\frac{1}{3}$
$\ln\frac{2}{3}$

$18.\int_0^1 \ln(x+1)dx$ ni hisoblang
$2\ln 2-1$
$2\ln 2+1$
$-2\ln 2-1$
$\ln 2-1$

19.Integralni hisoblang: $\int_0^3 e^{\frac{x}{3}}dx$
$3(e-1)$
$3e-1$
$(e-3)$
$3(e+1)$

$20.\int_0^1 \left(\sqrt{x}-x^2\right)dx$ ni hisoblang
$\frac{1}{3}$
$-\frac{1}{3}$
$\frac{1}{2}$
$-\frac{1}{2}$

$21.\int_0^{\frac{1}{2}} \frac{dx}{\sqrt{1-4x^2}}$ ni hisoblang
$\frac{\pi}{4}$
$\frac{\pi}{6}$
$\frac{\pi}{2}$
$\frac{\pi}{3}$

$22.\int_1^2 \frac{2xdx}{x^2+2}$ ni hisoblang
$\ln 2$
$\ln 3$
$2\ln 3$

$\frac{3}{2}\ln 3$

23.Quyidagi chiziqlar bilan chegaralangan yuzani hisoblang. $y=\sqrt{x},\ \ y=x$
$\frac{1}{6}$
$\frac{1}{4}$
$\frac{1}{3}$
$\frac{1}{5}$

24.Integralni toping: $\int \frac{1}{\sin^2 7x}dx$
$-\frac{1}{7}ctg7x$
$7tg7x$
$ctg7x$
$\frac{1}{7}tg7x$

25.Integralni toping: $\int \frac{dx}{\sqrt{1-9x^2}}$
$\frac{1}{3}\arcsin 3x$
$\arcsin 3x$
$-\frac{1}{3}\arcsin 3x$
$-\arcsin 3x$

26. $\int_{-4}^{-2} \frac{dx}{\sqrt{5-4x-x^2}}$ ni hisoblang
$\arcsin\frac{2}{3}$
$-\arcsin\frac{2}{3}$
$\arccos\frac{2}{3}$
$-\arccos\frac{2}{3}$

$27.\int_0^1 arctgxdx$ ni hisoblang
$\frac{\pi-\ln 4}{4}$
$-\frac{\pi-\ln 4}{4}$
$\frac{\pi+\ln 4}{4}$
$\pi-\ln 4$

$28.\int_1^e (x+1)\ln x dx$ ni hisoblang
$\frac{e^2+5}{4}$
$\frac{e^2-5}{2}$
$-\frac{e^2+5}{4}$
e^2+5

$29.\int_2^3 x(3-x)^7\,dx$ ni hisoblang
$\frac{19}{72}$
2
3
$\frac{19}{36}$

$30.\int_1^4 x^2 dx$ ni hisoblang
21
22
–21
–22

“IQTISODCHILAR UCHUN MATEMATIKA”
FANIDAN TEST TOPSHIRIQLARI

1.

Limitni toping $\lim\limits_{x\to 7}\dfrac{2-\sqrt{x-3}}{x^2-7x}$
$-\dfrac{1}{28}$
$\dfrac{1}{28}$
0
$-\dfrac{1}{7}$

2.

$\lim\limits_{x\to 0}\dfrac{2x^3}{x-\sin x}-?$
12
-12
$\dfrac{1}{12}$
$-\dfrac{1}{12}$

3.

Limitni toping $\lim\limits_{x\to 3}\dfrac{x^2-2x-3}{x^2+x-12}$
$\dfrac{4}{7}$
$\dfrac{1}{4}$
1
0

4.

$\lim\limits_{x\to \pi}\ \dfrac{tg7x}{\sin 8x}-?$
0
s
s
s

5.

Limitni toping $\lim\limits_{x\to 0} \dfrac{3tg5x}{\sin 4x}$
$\dfrac{15}{4}$
$\dfrac{12}{5}$
$\dfrac{4}{15}$
$\dfrac{5}{12}$

6.

$\lim\limits_{x\to 0} \dfrac{3x-\sin x}{tgx+2x}$
$\dfrac{3}{2}$
0
$\dfrac{4}{3}$
1

7.

Limitni toping $\lim\limits_{n\to\infty} \dfrac{\sqrt[3]{8n^3+2n^2-1}}{n+3}$
2
0
∞
$\sqrt[3]{2}$

8.

Limitni toping $\lim\limits_{x\to 0} \dfrac{4^x-1}{x^2+x}$
$\ln 4$
0
$\ln 2$
$\dfrac{1}{2}\ln 2$

9.

$\lim\limits_{x\to 4}\dfrac{x^2-5x+4}{x^2-7x+12}-?$
3
-3
$\dfrac{1}{3}$
1

10.

Limitni toping $\lim\limits_{x\to 0}\dfrac{2x}{\sqrt{1+5x}-1}$
$\dfrac{4}{5}$
$\dfrac{2}{5}$
0
2

11.

Limitni toping $\lim\limits_{x\to 0}\left(1+\frac{3}{4}x\right)^{\frac{1}{5x}}$
$\ell^{\frac{3}{20}}$
$\ell^{\frac{15}{4}}$
$\ell^{\frac{4}{15}}$
$\ell^{\frac{20}{3}}$

12.

$\lim\limits_{x\to \pi}\dfrac{tg5x}{10\sin 4x}$
$\dfrac{1}{8}$
$-\dfrac{1}{8}$
$\dfrac{1}{2}$
8

13.

Limitni hisoblang $\lim\limits_{x\to 0}\dfrac{3x-\sin 3x}{2x^3}$

$\frac{9}{4}$
$-\frac{9}{4}$
0
$\frac{4}{9}$

14.

$y=\log_5\left(x^2-3x\right)\ \ y'(5)-?$
$\frac{7}{10\ln 5}$
$\frac{10}{7\ln 5}$
$\frac{7\ln 5}{5}$
$\frac{7}{5\ln 5}$

15.

$y=\cos^2\frac{4x}{3}+\sin^2\frac{4x}{3},\ \ y'\left(\sqrt{2\pi}\right)-?$
0
1
1,5
2

16.

$y=3\cdot 4^{2x},\ \ y'(\log_{16}3)-?$
$9\ln 16$
$9\ln 4$
$81\ln 16$
$81\ln 4$

17.

$y=x^2\ln x,\ \ dy-?$
$x(2\ln x+1)dx$
$x(\ln x+1)dx$
$2x\ln xdx$
$\left(2x+\frac{1}{x}\right)dx$

18.

$y=\sqrt[3]{x}+\frac{1}{\sqrt{x}},\ \ y'(1)-?$
$-\frac{1}{6}$
$-\frac{5}{6}$
$\frac{5}{6}$
$\frac{1}{6}$

19.

$y=2tg3x,\qquad y'\left(\frac{\pi}{4}\right)-?$
12
$12\sqrt{2}$
-12
$6\sqrt{2}$

20.

$y=\left(x^2+2x\right)^3,\qquad y''(-1)-?$
6
2
3
-6

21.

$y=\log_3(\sin 4x),\quad y'-?$
$\frac{4ctg4x}{\ln 3}$
$-\frac{ctg4x}{\ln 3}$
$\frac{ctg4x}{\ln 3}$
$-\frac{4ctg4x}{\ln 3}$

22.

$x=2$ nuqtada hosilasi mavjud bo`lmagan funksiyani toping
$y=\lvert\log_2(x-1)\rvert$
$y=\lvert x-1\rvert$
$y=2^{x-1}$
$y=(x-1)^2$

23.

$y=\cos(\sin 2x), y'-?$
$-2\cos 2x\cdot\sin(\sin 2x)$
$2\sin(\sin 2x)$
$-2\sin(\sin 2x)$
$2\cos 2x\cdot\cos(\sin 2x)$

24.

$y=\dfrac{2\sqrt{x}}{\sqrt{x+2}},\ y'(1)-?$
$\dfrac{2}{3\sqrt{3}}$
$\dfrac{4}{9}$
$-\dfrac{4}{9}$
1

25.

$y=x^2e^x,\quad dy-?$
$xe^x(2+x)dx$
$e^x(2+x^2)dx$
$2xe^x dx$
$e^x(2+x)dx$

26.

$y=\log_2(x^2-1),\ y'(4)-?$
$\dfrac{8}{15\ln 2}$
$\dfrac{8\ln 2}{15}$
$\dfrac{15}{8\ln 2}$
$\dfrac{15\ln 2}{8}$

27.

$y=x^3\ln x, dy-?$
$x^2(3\ln x+1)dx$
$x(3\ln x+1)dx$

$3x^2 \ln x dx$
$3xdx$

28.

$y = \log_2(tgx), \quad y' - ?$
$\frac{2}{\sin 2x \cdot \ln 2}$
$\frac{2}{\sin x \ln 2}$
$\frac{1}{cox \ln 2}$
$\frac{1}{\sin 2x \ln 2}$

29.

$y = (\sin 3x)^2 \quad y'''\left(\frac{\pi}{6}\right)$ ni toping
0
108
-108
54

30.

$y = \arcsin\sqrt{2^x - 1}, \quad y' - ?$
$\frac{2^x \ln 2}{\sqrt{2 - 2^x}} * \frac{1}{2\sqrt{2^x - 1}}$
$-\frac{2^x \ln 2}{\sqrt{2^x - 2}}$
$-\frac{2^x \ln 2}{\sqrt{2^x - 4}}$
$\frac{2^x \ln 2}{\sqrt{2^x - 2}}$

31.

Oshkormas funksiyaning hosilasini toping $2xy + y^2 = \ln x$
$y' = \frac{1 - 2xy}{x(2x + 2y)}$
$y' = \frac{1 + 2xy}{x(2x + 2y)}$
$y' = \frac{1 - 2xy}{x(2x - 2y)}$

$y' = \dfrac{1-2xy}{y(2x+2y)}$

32.

I-tur uzlishga ega bo`lgan funksiyani toping
$y = \dfrac{4\lvert x+7\rvert}{x+7}$
$y = tgx$
$y = \dfrac{x-2}{x+1}$
$y = \cos 2x$

33.

$y = 2+3^{\frac{1}{x-2}}$ funksiyaning $x = 2$ nuqtadagi chap limitini toping
2
$+\infty$
3
1

34.

$y = \begin{cases} 3x, x \neq 5 \\ 0, x = 5 \end{cases}$ funksiyaning uzilish nuqtasini va uning turini aniqlang.
$x = 5,$ bartaraf etish mumkin bo`lgan uzilish nuqta
$x = 5,$ I-tur
$x = 5,$ II-tur
$x = 3,$ I-tur

35.

$\lim\limits_{x \to 4+0} \dfrac{3}{5^{\frac{1}{x-4}}+1} - ?$
0
$+\infty$
$-\infty$
3

36.

II-tur uzilishga ega bo`lgan funksiyani toping
$y = \dfrac{5-x}{\lvert 5-x\rvert} + 4$
$y = \dfrac{1}{\lvert x\rvert - 1}$

$y=\frac{3-x}{3+x}$
$y=\ln x$

37.

Qaysi funksiyanig faqat 2ta gorizontal asimptotasi mavjud
$y=\frac{1}{3}arctg2x$
$y=\frac{1}{x^2}$
$y=\frac{x^2+1}{x-6}$
$y=\frac{x^2-3}{x^2-1}$

38.

II-tur uzilishga ega bo`lgan funksiyani toping
$y=9^{\frac{3}{x-1}}$
$y=\frac{\cos^2 x-2}{3}$
$y=\frac{1}{3}\left(x^2-4x\right)$
$y=\frac{\lvert x-1\rvert}{2x-2}$

39.

Funksiyaning uzilish nuqtasi va uning turini aniqlang $y=2^{\frac{3}{-x-4}}$
$x=-4, II-tur$
$x=4, II-tur$
$x=-4, I-tur$
$x=4, I-tur$

40.

$y=\frac{x^3-4}{2x^3-16}$ funksiyaning asimptotalarini aniqlang
$y=\frac{1}{2}gorizantal$ $x=2vertikal$
$y=2gorizantal$ $x=2vertikal$
$x=2vertikal$

$y = 2vertikal$ $x = 2gorizantal$

41.

$y = \frac{1}{2} arctgx$ funksiyaning qanday assimptotalari mavjud?
$y = \pm \frac{\pi}{4}$ gorizontal
$x = \pm \frac{\pi}{2}$ vertika
$y = \pm \pi$ gorizontal
$y = \pm \frac{\pi}{2}$ gorizontal

42.

Berilgan funksiyalardan uzilishga ega bo`lgan funksiyani toping
$y = ctg3x$
$y = \frac{3 - \sin 4x}{5}$
$y = \frac{4 - x^2}{5}$
$y = \log_2 x$

43

$y = \cos x$ funksiya Makloven formulasi yordamida yoyiladi. Ko`phadning 5-hadini toping
$\frac{x^8}{8!}$
$-\frac{x^8}{8!}$
$-\frac{x^6}{6!}$
$\frac{x^6}{6!}$

44.

$y = e^x$ funksiya Makloren formulasi yordamida yoyilganda yig`indining 5-hadini toping
$\frac{x^4}{4!}$
$\frac{x^5}{5!}$

$\frac{x^3}{3!}$
$\frac{x^2}{2!}$

45.

$y=x^4+2x-1$ funksiyaning $x=-1$ nuqtasiga o`tkazilgan urinmaning burchak koeffitsiyentini toping
6
2
-2
4

46

$y=-x^2+20x-3$ funksiyaning maksimum qiymatini toping
97
10
103
-97

47

$y=x^2-1$ funksiyaning $(-1;0)$ nuqtasiga o`tkazilgan urinma tenglamasini tuzing?
$y=-2x-2$
$y=-2x$
$y=-2x+2$
$y=2x-2$

48.

$y=2x^3+1$ funksiyaning $x=-1$ nuqtasiga o`tkazilgan urinmaning tenglamasini tuzing
$y=6x+5$
$y=6x-5$
$y=-6x+5$
$y=-6x+4$

49.

$y=x^4-x^3$ funksiyaning kamayish oraliqlarini toping
$\left(-\infty;\frac{3}{4}\right)$
$(-\infty;0)\cup\left(0;\frac{3}{4}\right)$

$\left(-\infty;\frac{4}{3}\right)$
$\left(0;\frac{3}{4}\right)$

50.

Qaysi funksiya uchun $[-1;1]$ kesmada Roll teoremasi o`rinli
$y=\cos x$
$y=\lvert x\rvert-1$
$y=\lvert x\rvert$
$y=\sqrt[3]{x^2}$

51.

$y=\sqrt{2x}$ funksiyaning $x=1$ nuqtasiga o`tkazilgan urinmaning OX o`qining musbat yo`nalishi bilan hosil qilgan burchagini toping
$45°$
$60°$
$30°$
120°

52.

$y=x^3-4x^2+5$ funksiyaning kamayish oraliqlarini toping
$\left[0;\frac{8}{3}\right]$
$(-\infty;0)\cup\left(\frac{8}{3};+\infty\right)$
$\left(0;\frac{4}{3}\right)$
$(-\infty;0)\cup\left(\frac{4}{3};+\infty\right)$

53

$y=x^2-6x+3$ funksiyaning kritik nuqtasi va shu nuqtadagi qiymatini toping
$x=3,\quad y=-6$
$x=-3,\quad y=30$
$x=-6,\quad y=75$
$x=6,\quad y=3$

54.

$[-2;2]$ kesmada Roll teoremasi shartlari bajariladigan funksiyani toping

$y=1-x^2$
$y=x^3-1$
$y=\|2-x\|$
$y=\sqrt[3]{x^2}$

55.

$y=2x^3-1$ funksiyaning qaysi nuqtasiga o`tkazilgan urinmasi y=2x-1 to`g`ri chiziqqa parallel bo`ladi?
$\pm\frac{1}{\sqrt{3}}$
$x=\pm\frac{1}{3}$
$x=\frac{1}{6}$
$x=-\frac{1}{\sqrt{3}}$

56.

$y=x^2-2x$ funksiyaning x=1 nuqtasidagi o`tkazilgan urinmaning OY o`qini kesib o`tish nuqtasini toping
y=-1
y=1
y=0
y=2

57.

$y=-x^2+6x-3$ funksiyaning o`sish oralig`ini toping
$x<3$
$x<6$
$x>3$
$x>-6$

58.

$y=3\ln x^2$ funksiyaning x=3 nuqtasiga o`tkazilgan urinmaning burchak koeffitsiyentini toping
2
3
$\frac{1}{3}$
1

59.

$y = x^2 - 3x + 2$ funksiyaning qaysi nuqtasiga o`tkazilgan urinma y=2x-3 to`g`ri chiziqqa perpendikulyar bo`ladi?
x=1,25
x=-1,25
x=0,8
x=-0,8

60.

Funksiyaning qiymatlar to`plamini toping $y = \sin x - \cos x$
$\left[-\sqrt{2};\sqrt{2}\right]$
$[-2;2]$
$[-1;1]$
$\left(-\sqrt{2};\sqrt{2}\right)$

Tuzuvchi: U. S. Maxmasaidova

Iqtisodchilar uchun matematika

Test Xolbozorov Q.

(2-semestr)

Xosmas integral. Aniq integralni taqribiy hisoblash va uning geometrik va iqtisodiy ma’nosi

1.

Aniq inegralning geometriyaga oid masalalarni yechishga tatbiqi
Yassi shakllar yuzalarini hisoblash
Chiziq va doiraning inertsiya momentlarini hisoblash
Aylana yuzasini hisoblash
Tekis shaklning og’irlik markazini hisoblash

2.

Egri chiziq yoyining uzunligini hisoblash formulasini toping:
$l=\int_a^b \sqrt{1+\left(f'(x)\right)^2}\,dx$ $(y=f(x),\ x\in[a;b]$ tenglama bilan berilgan)
$l=\int_{t_1}^{t_2} \sqrt{(x')^2-\left(y'\right)^2}\,dt$ $(x=x(t),\ y=y(t),\ t\in[t_1;t_2]$ parametrik tenglama bilan berilgan)
$l=\int_a^b \sqrt{1-\left(f'(x)\right)^2}\,dx$ $(y=f(x),\ x\in[a;b]$ tenglama bilan berilgan)
$l=\int_{t_1}^{t_2} \sqrt{(x')^2+\left(y'\right)}dt$ $(x=x(t),\ y=y(t),\ t\in[t_1;t_2]$ parametrik tenglama bilan berilgan)

3.

$y=3x-x^2$ va $y=-x$ chiziqlar bilan chegaralangan shaklning yuzini hisoblang.
$\frac{32}{3}$
$\frac{34}{3}$
$\frac{31}{3}$
11

4.

Uchlarining abssissalari $x_1=3$ va $x_2=8$ bo'lgan $y=\frac{2}{3}\sqrt{x^3}$ egri chiziqning uzunligini hisoblang.
$\frac{38}{3}$
$\frac{34}{3}$
$\frac{35}{3}$
$\frac{37}{3}$

5.

$y = 4 - x^2$ va Ox o'qi bilan chegaralangan shaklning yuzini hisoblang.
$\frac{32}{3}$
$\frac{31}{3}$
$\frac{29}{3}$
$\frac{27}{3}$

6.

$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ellipsni Oy o'qi atrofida aylantirish bilan hosil qilingan jismning hajmini hisoblang.
$\frac{4}{3}\pi a^2 b$
$\frac{3}{4}\pi ab^2$
$\frac{4}{3}\pi ab^2$
$\frac{4}{3}\pi a^2 b^2$

7.

$y=5-x^2$ va $y=x-1$ chiziqlar bilan chegaralangan shaklning yuzini hisoblang.
$20\frac{5}{6}$
$18\frac{5}{6}$
$19\frac{5}{6}$
$17\frac{5}{6}$

8.

$y=\ln(\sin x)$ egri chiziqning $x=\frac{\pi}{3}$ dan $x=\frac{\pi}{2}$ gacha bo'lgan yoyining uzunligini hisoblang
$-\frac{1}{2}\ln\frac{1}{3}$
$\ln 9$
$-\ln 9$
$\frac{1}{2}\ln\frac{1}{3}$

9.

Oxy tekislikda yotuvchi va $y^2 = 4 - x,\ \ x = 0$ chiziqlar bilan chegaralangan shaklning Oy o'qi atrofida aylanishidan hosil bo'lgan jismning hajmini hisoblang.
$V_y = \frac{512}{15}\pi$
$V_y = \frac{511}{15}\pi$
$V_y = \frac{513}{15}\pi$
$V_y = 24\pi$

10.

$\int_1^{+\infty} \frac{dx}{x^4}$ ni hisoblang
$\frac{1}{3}$
$0,5$
$0,25$
uzoqlashuvchi

11.

$\int_0^1 x\ln x dx$ xosmas integralni hisoblang
$-0,25$
$-0,5$
$0,5$
uzoqlashuvchi

12.

$\int_{-1}^1 \frac{dx}{x\sqrt[3]{x}}$ xosmas integralni yaqinlashishiga tekshiring
uzoqlashuvchi
yaqinlashuvchi, 6
yaqinlashuvchi, -6
yaqinlashuvchi, $\frac{3}{7}$

13.

To‘g‘ri jumlani toping:
$\int_1^{+\infty} \frac{dx}{(x+1)^{\alpha}}$ integral $\alpha>1$ da yaqinlashuvchi
$\int_1^{+\infty} \frac{dx}{(x+1)^{\alpha}}$ integral $\alpha\geq 1$ da yaqinlashuvchi
$\int_1^{+\infty} \frac{dx}{(x+1)^{\alpha}}$ integral $\alpha<1$ da yaqinlashuvchi
$\int_1^{+\infty} \frac{dx}{(x+1)^{\alpha}}$ $\alpha\leq 0$ da uzoqlashuvchi

14.

$\int_2^{\infty} \frac{xdx}{\sqrt{(x^2-3)^3}}$ xosmas integralni hisoblang
1
3
5
-3

15.

Agar $f(x)$ va $\varphi(x)$ funksiyalar $[a;+\infty)$ da aniqlangan, uzluksiz va $0 \le f(x) \le \varphi(x)$ shartni qanoatlantirsa, u holda to‘g‘ri xulosalarni ko‘rsating:
$\int_a^{+\infty} \varphi(x)dx$ yaqinlashuvchi bo‘lganda $\int_a^{+\infty} f(x)dx$ ham yaqinlashuvchi bo‘ladi
$\int_a^{+\infty} f(x)dx$ yaqinlashuvchi bo‘lganda $\int_a^{+\infty} \varphi(x)dx$ har doim uzoqlashuvchi bo‘ladi
$\int_a^{+\infty} \varphi(x)dx$ uzoqlashuvchi bo‘lganda $\int_a^{+\infty} f(x)dx$ ham uzoqlashuvchi bo‘ladi
$\int_a^{+\infty} f(x)dx$ yaqinshuvchi bo‘lganda $\int_a^{+\infty} \varphi(x)dx$ ham yaqinlashuvchi bo‘ladi.

16.

Noto‘g‘ri xulosalarni ko‘rsating: $f(x)$ va $\varphi(x)$ funksiyalar $[a;b)$ da uzluksiz bo‘lib, b esa ularning maxsus nuqtasi va $0 \le f(x) \le \varphi(x)$, $x \in [a;b)$ bo‘lsin. U holda:
$\int_a^b \varphi(x)dx$ uzoqlashuvchi bo‘lsa, $\int_a^b f(x)dx$ ham uzoqlashuvchi bo‘ladi
$\int_a^b f(x)dx$ uzoqlashuvchi bo‘lsa, $\int_a^b \varphi(x)dx$ ham uzoqlashuvchi bo‘ladi
$\int_a^b \varphi(x)dx$ yaqinlashuvchi bo‘lsa, $\int_a^b f(x)dx$ ham yaqinlashuvchi bo‘ladi
$\int_a^{+\infty} f(x)dx$ yaqinlashuvchi bo‘lganda $\int_a^{+\infty} \varphi(x)dx$ uzoqlashuvchi bo‘lishi mumkin

17.

Uzoqlashuvchi integrallarni ko‘rsating:
$\int_0^{+\infty} \frac{1}{1+\sqrt{x}}dx$
$\int_0^{1000000} \frac{1}{1+x}dx$
$\int_{-\infty}^{-2} \frac{\sin x}{x^2}dx$
$\int_1^{+\infty} \frac{1}{(1+x)^2}dx$

18.

Uzoqlashuvchi integrallarni ko‘rsating:
$\int_0^{+\infty} \frac{1}{\sqrt{1+x}} dx$
$\int_0^{+\infty} \frac{1}{(2+x)^3} dx$
$\int_{-4}^{5} \frac{1}{\sqrt{4+x}} dx$
$\int_{0.1}^{1} \frac{1}{1+x} dx$

Birinchi tartibli va ikkinchi tartibli differensial tenglamalar

1.

Fundamental yechimlar sistemasi berilganda chiziqli bir jinsli differensial tenglamani tuzing sin 3x, cos 3x
$y'' + 9y = 0$
$y'' - 9y = 0$
$y'' + 2y = 0$
$y'' + 5y = 0$

2.

Fundamental yechimlar sistemasi berilganda chiziqli bir jinsli differensial tenglamani tuzing 1, e^x
$y'' - y' = 0$
$y'' + 2y' = 0$
$y'' - 4y' = 0$
$y'' - 3y' = 0$

3.

Fundamental yechimlar sistemasi berilganda chiziqli bir jinsli differensial tenglamani tuzing e^{-x}, e^x
$y'' - y = 0$
$y'' - 3y = 0$
$y'' + 2y = 0$
$y'' - 4y = 0$

4.

Chegaraviy masalani yeching. $y'' + y = 0$, y(0)=0, $y(\frac{\pi}{2}) = \alpha$
$y = \alpha \sin x$
$y = \alpha \cos x$
$y = -\alpha \cos x$
$y = -\alpha \sin x$

5.

Chegaraviy masalani yeching $y'' - 2y' + 2y = 0,\quad y(0)=0,\ y'(\pi) = e^{\pi}$
$y = -e^{x}\sin x$
$y = e^{x}\cos x$
$y = -e^{x}\cos x$
$y = e^{x}\sin x$

6.

Chegaraviy masalani yeching $y'' + \alpha y' = 0,\ \ y(0)= e^{\alpha},\ y'(1) = 0$
$y = e^{\alpha}$
$y = e^{x}$
$y = -2e^{\alpha}$
$y = 3e^{x}$

7.

Bir jinsli bo’lmagan tenglamani yeching $y'' - 8y' + 7y = 14$
$y = c_1 e^{x} + c_2 e^{7x} + 2$
$y = c_1 e^{3x} + c_2 e^{5x} + 1$
$y_1 = c_1\left(e^{x} + e^{7x}\right) - 2$
$y = c_1 e^{4x} + c_2 e^{3x} - 1$

8.

Chiziqli differensial tenglamani yeching $y' - \frac{3y}{x} = x$
$y = cx^3 - x^2$
$y = x^3\left(\frac{1}{x} + cx\right)$
$y = x^3 \cdot c$
$y = cx^3 - 1$

9.

Chiziqli differensial tenglamani yeching $y' + \frac{2y}{x} = \frac{e^{-x^2}}{x}$
$y = \frac{1}{x^2}\left(c - \frac{e^{-x^2}}{2}\right)$
$y = \frac{e^{x^2} \cdot e}{2x}$
$y = \frac{e^{-x^2}}{2x^2} + c$
$y = x^{-2} \cdot c$

10.

Bernulli tenglamasini umumiy yechimini toping $y'+2y=y^2e^x$
$\frac{1}{y}=e^x\left(1+ce^x\right)$
$\frac{1}{y}=e^x\left(x+e^x\cdot c\right)$
$y=e^x(c+e^x)$
$y=e^x(1+ce^x)$

11.

Umumiy yechimini toping $xy^2y'=x^2+y^3$
$y^3=cx^3-3x^2$
$y^3x^2=c-x^2$
$y^3=x^2+3c$
$y^3=3c-3x^2$

12.

Umumiy yechimini toping $y'x + y = -xy^2$
$y = \frac{1}{x \ln cx}$
$y = \frac{x}{\ln cx}$
y=lncx
y=xlncx

13.

To`la differensial tenglamani yechimini toping $2xydx + \left(x^2 - y^2\right)dy = 0$
$3x^2y-y^3=c$
$3x^2-y^3=c$
$y^3-x^3y=c$
$xy-y^3=c$

14.

To`la differensial tenglamani umumiy yechimini toping $\left(4-\frac{y^2}{x^2}\right)dx+\frac{2y}{x}dy=0$
$4x^2+y^2=cx$
$x^2+4y^2=c$
$F=c-2x+y^2$
$F=x+4y^2$

15.

To`la differensial tenglamani umumiy yechimini toping $e^{-y}dx+\left(1-xe^{-y}\right)dy=0$
$y+xe^{-y}=c$
$xe^{-y}+c=0$
$1+ye^{-y}=c$
$e^{-y}+x=c$

16.

Sistemani yeching $\begin{cases} x' = 2x + y \\ y' = 4y - x \end{cases}$
$\begin{cases} x = \left(c_1 + \left(c_2 - c_1\right)t\right)e^{3t} \\ y = \left(c_2 + \left(c_2 - c_1\right)t\right)e^{3t} \end{cases}$
$\begin{cases} x = c_1 + c_2 e^{3t} \\ y = -c_1 + c_2 e^{3t} \end{cases}$
$\begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 1 \\ 1 \end{pmatrix} c_1 + c_2 \begin{pmatrix} 1 \\ 3 \end{pmatrix} e^{3t}$
$\begin{pmatrix} x \\ y \end{pmatrix} = c_1 \begin{pmatrix} -1 \\ 1 \end{pmatrix} e^{t} + c_2 \begin{pmatrix} 1 \\ 1 \end{pmatrix} e^{3t}$

17.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = x - 3y \\ y' = 3x + y \end{cases}$
$\begin{cases} x = e^t(c_1 \cos t + c_2 \sin t) \\ y = e^t(c_1 \cos t - c_2 \sin t) \end{cases}$
$\begin{cases} x = c_1 e^{-3t} + 3c_2 e^t \\ y = c_1 e^{-3t} - c_2 e^t \end{cases}$
$\begin{cases} x = c_1 e^t + 3c_2 e^{3t} \\ y = c_1 e^t + c_2 e^{3t} \end{cases}$
$\begin{cases} x = e^t(c_1 \cos 3t + c_2 \sin 3t) \\ y = e^t(c_1 \sin 3t - c_2 \cos 3t) \end{cases}$

18.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = 7x + 3y \\ y' = 6x + 4y \end{cases}$
$\begin{cases} x = c_1 e^{10t} + c_2 e^{t} \\ y = c_1 e^{10t} - 2c_2 e^{t} \end{cases}$
$\begin{cases} x = 3c_1 e^{7t} + c_2 e^{3t} \\ y = -c_1 e^{7t} - c_2 e^{3t} \end{cases}$
$\begin{cases} x = c_1 e^{6t} - c_2 e^{4t} \\ y = 2c_1 e^{6t} + c_2 e^{4t} \end{cases}$
$\begin{cases} x = 6c_1 e^{3t} + c_2 e^{4t} \\ y = c_1 e^{3t} + 4c_2 e^{4t} \end{cases}$

19.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = 2x \\ y' = x + 2y \end{cases}$
$\begin{cases} x = c_2 e^{2t} \\ y = c_1 e^{2t} + c_2 t e^{t} \end{cases}$
$\begin{cases} x = c_1 e^{t} + c_2 e^{3t} \\ y = -2c_1 e^{t} + c_2 e^{3t} \end{cases}$
$\begin{cases} x = 2c_1 e^{4t} - c_2 e^{t} \\ y = c_1 e^{4t} + c_2 e^{t} \end{cases}$
$\begin{cases} x = (c_1 + c_2 t) e^{4t} \\ y = (c_1 + c_2 t) e^{4t} \end{cases}$

20.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = 4x - 3y \\ y' = 3x + 4y \end{cases}$
$\begin{cases} x = e^{4t}(c_1 \cos 3t + c_2 \sin 3t) \\ y = e^{4t}(c_1 \sin 3t - c_2 \cos 3t) \end{cases}$
$\begin{cases} x = e^{t}(c_1 \cos 4t + c_2 \sin 4t) \\ y = e^{t}(c_1 \sin 4t + c_2 \cos 4t) \end{cases}$
$\begin{cases} x = e^{-3t}(c_1 \cos t - c_2 \sin t) \\ y = e^{-3t}(c_1 \sin t + c_2 \cos t) \end{cases}$
$\begin{cases} x = e^{3t}(c_1 \cos 4t + c_2 \sin 4t) \\ y = e^{3t}(c_1 \sin 4t + c_2 \cos 4t) \end{cases}$

21.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = 5x - y \\ y' = x + 3y \end{cases}, \quad x(0) = 2, y(0) = 2$
$\begin{cases} x = 2e^{4t} \\ y = 2e^{4t} \end{cases}$
$\begin{cases} x = -e^{-t} + 5e^{t} \\ y = 2e^{-t} - e^{t} \end{cases}$
$\begin{cases} x = 3e^{5t} + 5e^{t} \\ y = -e^{5t} + 2e^{t} \end{cases}$
$\begin{cases} x = -e^{3t} + e^{t} \\ y = 2e^{3t} + 5e^{t} \end{cases}$

22.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = y + 1 \\ y' = 2e^x - x \end{cases}$
$\begin{cases} x = c_1 \cos t + c_2 \sin t + e^t \\ y = -c_1 \sin t + c_2 \cos t + e^t - 1 \end{cases}$
$\begin{cases} x = e^{3t}(c_1 \cos t - c_2 \sin t) + 1 \\ y = e^{3t}(c_1 \sin t + c_2 \cos t) \end{cases}$
$\begin{cases} x = c_1 \cos 2t - c_2 \sin 2t + e^t \\ y = c_1 \sin 2t + c_2 \cos 2t + e^t \end{cases}$
$\begin{cases} x = c_1 \cos 3t + 2c_2 \sin 3t - e^t \\ y = c_1 \sin 3t + c_2 \cos 3t + e^t - 2 \end{cases}$

23.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = x - y \\ y' = -4x + 4y \end{cases}$
$\begin{cases} x = c_1 + c_2 e^{5t} \\ y = c_1 - 4c_2 e^{5t} \end{cases}$
$\begin{cases} x = c_1 e^{t} - c_2 e^{-4t} \\ y = -4c_1 e^{t} + 4c_2 e^{-4t} \end{cases}$
$\begin{cases} x = 3c_1 e^{t} + c_2 e^{-t} \\ y = c_1 e^{t} + c_2 e^{-t} \end{cases}$
$\begin{cases} x = c_1 e^{t} - c_2 \\ y = c_1 e^{t} + c_2 \end{cases}$

24.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = 3x - y \\ y' = 10x - 4y \end{cases}$
$\begin{cases} x = c_1 e^{-2t} + c_2 e^{t} \\ y = 5c_1 e^{-2t} + 2c_2 e^{t} \end{cases}$
$\begin{cases} x = (c_1 + c_2) e^{t} \\ y = (c_1 + 2c_2) e^{t} \end{cases}$
$\begin{cases} x = c_1 e^{10t} + c_2 e^{-t} \\ y = -c_1 e^{10t} + 2c_2 e^{-t} \end{cases}$
$\begin{cases} x = c_1 e^{4t} + c_2 e^{3t} \\ y = c_1 e^{4t} + c_2 e^{3t} \end{cases}$

25.

Koshi masalasi yechimi topilsin. $\begin{cases} x' = 3x - y \\ y' = 10x - 4y \end{cases}$, $x(0) = 1, y(0) = 5$
$\begin{cases} x = e^{-2t} \\ y = 5e^{-2t} \end{cases}$
$\begin{cases} x = e^{3t} - 1 \\ y = e^{3t} + 5 \end{cases}$
$\begin{cases} x = e^{3t} + e^{-t} \\ y = e^{3t} - 4e^{-t} \end{cases}$
$\begin{cases} x = e^{-t} \\ y = 10e^{-t} \end{cases}$

26.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = 3x + 8y \\ y' = -x - 3y \end{cases}$
$\begin{cases} x = -4c_1e^{t} - 2c_2e^{-t} \\ y = c_1e^{t} + c_2e^{-t} \end{cases}$
$\begin{cases} x = c_1e^{3t} + c_2e^{t} \\ y = c_1e^{3t} + c_2e^{t} \end{cases}$
$\begin{cases} x = 3c_1e^{t} + 8c_2e^{-t} \\ y = -c_1e^{t} - 3c_2e^{-t} \end{cases}$
$\begin{cases} x = -c_1e^{t} + 3c_2e^{8t} \\ y = c_1e^{t} + 2c_2e^{8t} \end{cases}$

27.

Koshi masalasi yechimi topilsin. $\begin{cases} x' = 3x + 8y \\ y' = -x - 3y \end{cases}$, $x(0) = 6, y(0) = -2$
$\begin{cases} x = 4e^{t} + 2e^{-t} \\ y = -e^{t} - e^{-t} \end{cases}$
$\begin{cases} x = 2e^{3t} + 8e^{t} \\ y = -3e^{3t} + 6e^{t} \end{cases}$
$\begin{cases} x = 3e^{t} + 8e^{-t} \\ y = -e^{t} - 3e^{-t} \end{cases}$
$\begin{cases} x = -e^{t} + 3e^{8t} \\ y = e^{t} + 2e^{8t} \end{cases}$

28.

Chiziqli differensial tenglamalar sistemasini yeching: $\begin{cases} x' = y + 1 \\ y' = x + 1 \end{cases}$
$\begin{cases} x = c_1 e^{t} + c_2 e^{-t} - 1 \\ y = c_1 e^{t} - c_2 e^{-t} - 1 \end{cases}$
$\begin{cases} x = c_1 e^{t} - c_2 e^{-t} \\ y = -c_1 e^{t} - c_2 e^{-t} \end{cases}$
$\begin{cases} x = c_1 e^{t} - c_2 e^{-t} + 1 \\ y = c_1 e^{t} + c_2 e^{-t} - 1 \end{cases}$
$\begin{cases} x = (c_1 + c_2) e^{-t} \\ y = (c_1 - c_2 e)^{-t} - 1 \end{cases}$

1. To`la differensialini toping $z=\sqrt{x^2+y^2}$, $dz=?$
$\frac{xdx+ydy}{\sqrt{x^2+y^2}}$
$\frac{ydy}{\sqrt{x^2+y^2}}$
$\frac{xdy}{\sqrt{x^2+y^2}}$
$\frac{ydx+xdy}{\sqrt{x^2+y^2}}$

2. Xususiy hosilani toping $z=e^{\sin\frac{y}{x}}$, $\frac{\partial z}{\partial y}=?$
$\frac{1}{x}e^{\sin\frac{y}{x}}\cdot\cos\frac{y}{x}$
$e^{\sin\frac{y}{x}}\cdot\cos\frac{y}{x}$
$\sin\frac{y}{x}e^{\sin\frac{y}{x}-1}$
$e^{\sin\frac{y}{x}}\cdot\sin\frac{y}{x}$

3. Funksiyaning xususiy hosilasini toping $z=2x^2y-xy^2$ $\frac{\partial z}{\partial x}=?$
$4xy-y^2$
$4x-y^2$
$4xy+2y$
$4-2y^2$

4. Funksiyaning xususiy hosilasini toping $z=y\ln x;\frac{\partial^2 z}{\partial x\partial y}=?$
$\frac{1}{x}$

$\frac{y}{x}$
$\frac{1}{y}$
$\frac{1}{xy}$

5. Funksiyaning xususiy hosilasini toping $z=x^2\ln y; \frac{\partial^2 z}{\partial x \partial y} = ?$
$\frac{2x}{y}$
$\frac{x}{y}$
$\frac{y}{x}$
$\frac{2y}{x}$

6. $f(x,y) = x^3 + 8y^3 - 6xy + 1$ funksiya ekstremumlarini toping.
$\min f(1;\frac{1}{2}) = 0$
$\max f(0;0) = 1$
$\min f(1;2) = 60$
ekstremum yo’q

7. $z = \frac{x^5}{\sqrt{y^3}} + \sqrt{x}y^4$ $M(4;4)$ nuqtada $(z'_x - z'_y)$ ni hisoblang.
-240
0
-96
96

8. $f(x,y)=x^3+y^3-6xy$ funksiyaning statsionar nuqtalarini toping
(0.0) va (2.2)
(0.0) va (3.3)
(0.1) va (2.3)
(1.1) va (2.3)

9. $z=yx^y$ Funksiyaning xususiy hosilasini toping. $\frac{\partial z}{\partial x}=?$
y^2x^{y-1}
y^2x^y
yx^{y-1}
x^{y-1}

10. $z=\ln\left(x^2-y^2\right)$ funksiyaning to'la differensialini toping.
$\frac{2xdx-2ydy}{x^2-y^2}$
$\frac{-2xdx-2ydy}{x^2-y^2}$
$\frac{2xdx+2ydy}{x^2-y^2}$
$\frac{xdx-ydy}{x^2-y^2}$

11. $z=2x-3y$ funksiyaning to'la differensialini toping.
$2dx-3dy$
$2dx+3dy$

$3dx - 2dy$
$3dx + 2dy$

12. $z = x^2 + y^2$ funksiyaning $(3; 2)$ nuqtadagi gradientini toping.
$2\sqrt{13}$
$2\sqrt{10}$
6
$2\sqrt{11}$

13. $z = \ln\left(\sqrt[4]{0,97} + \sqrt[3]{1,04} - 1\right)$ ni taqribiy hisoblang.
0,326
0,3
0,375
0

14. $(1,02)^4 \cdot (0,98)^3 (2,03)^2$ ni taqribiy hisoblang.
4,04
4,16
3,92
3,80

15. $z = 1 + x^2 y^3$ funksiyaning $(-1,1)$ nuqtadagi gradientini hisoblang.

$\sqrt{13}$
$\sqrt{5}$
13
1

16. $f(x_1, x_2) = x_1^2 - x_2^2 x_2 + 2e^{-x_1^2}$ funksiyaning ekstrimum nuqtasi bo'lmagan statsionar nuqtalari nechta?
2
3
1
0

17. funksiyaning ekstrimumini toping. $f(x_1, x_2, x_3) = x_1^2 + x_2^2 + (x_3 + 1)^2 - x_1 x_2 + x_1$
$f_{\min} = -\frac{1}{3} \quad X_0\left(-\frac{2}{3}, -\frac{1}{3}, -1\right)$
$f_{\max} = -\frac{1}{3} \quad X_0\left(-\frac{2}{3}, -\frac{1}{3}, -1\right)$
$f_{\min} = 1 \quad X_0(0,0,0)$
Ekstrimumi mavjud emas.

18. $f(x_1, x_2, x_3) = 8 - 6x_1 + 4x_2 - 2x_3 - x_1^2 - x_2^2 - x_3^2$ funksiyaning ekstrimumini toping.
$f_{\max} = 22 \quad X_0(-3, 2, -1)$
$f_{\min} = 22 \quad X_0(-3, 2, -1)$
$f_{\max} = 8 \quad X_0(0,0,0)$

Ekstrimumi mavjud emas.

19. $f(x_1, x_2, x_3) = x_1^2 + x_2^2 - x_3^2 - 4x_1 + 6x_2 - 2x_3$ funksiyaning ekstrimumini toping.
Ekstrimumi mavjud emas.
$f_{\min} = -12 \;\; X_0(2,-3,-1)$
$f_{\max} = 20 \;\; X_0(2,-3,-1)$
$f_{\max} = 0 \;\; X_0(0,0,0)$

20. $f(x_1, x_2, x_3) = 3x_1x_2 - x_1^2x_2 - x_1x_2^2$ funksiyaning ekstrimumini toping.
$X_0(1,1)$-nuqtada minimum $X_0(0,0)$-nuqtada ekstrimum mavjud emas
$X_0(1,1)$ nuqtada minimum -; $X_0(0,0)$ nuqtada maksimum.
$X_0(1,1)$- nuqtada ekstrimum mavjud emas $X_0(0,0)$ nuqtada minimum.
Ekstrimumi mavjud emas.

21. Noto'g'ri tasdiqni toping.
Agar funksiya biror bir M_0 nuqtada differensiallanuvchi bo'lsa, u holda funksiya ushbu nuqtada ekstrimumga ega bo'ladi.
Agar funksiya biror bir M_0 nuqtada differensiallanuvchi bo'lsa, u holda funksiya ushbu nuqtada uzluksiz bo'ladi.
Agar funksiya M_0 nuqtada differensiallanuvchi bo'lsa, u holda funksiya ushbu nuqtada barcha xususiy hosilalarga ega bo'ladi.
Agar funksiya M_0 nuqta atrofida barcha xususiy hosilalarga ega bo'lib, ushbu hosilalar M_0 nuqtada uzluksiz bo'lsa, u holda funksiya bu nuqtada differensiallanuvchi bo'ladi.

22. Nuqtalar o’rnini to’ldiring:Agar M_0 nuqtaning shunday $U_r(M_0)$ atrofi mavjud bo‘lsaki, barcha $M \in U_r(M_0)$ nuqtalar uchun $f(M_0) < f(M)$ tengsizlik bajarilsa, M_0 nuqta .... nuqta deyiladi.
lokal minimum
lokal maksimum
glabal minimum
glabal maksimum

23. Nuqtalar o’rnini to’ldiring:Agar M_0 nuqtaning shunday $U_r(M_0)$ atrofi mavjud bo‘lsaki, barcha $M \in U_r(M_0)$ nuqtalar uchun $f(M_0) > f(M)$ tengsizlik bajarilsa, M_0 nuqta .... nuqta deyiladi.
lokal maksimum
lokal minimum
glabal minimum
glabal maksimum

24. $f(x_1, x_2) = x_1^2 - x_1x_2 + x_2^2 + 6x_1 - 9x_2 - 5$ funksiyaning statsionar nuqtasini toping.
$(-1;4)$
$(-1;-4)$
$(1;4)$
$(4;4)$

25. Nuqtalar o’rnini to’ldiring: Agar $A=(a_{ij})$ matritsaning toq nomerda joylashgan bosh minorlariga mos son manfiy juft nomerda joylashgan bosh minorlariga mos son musbat bo‘lsa, u holda $A=(a_{ij})$ matritsa .....bo‘ladi.

manfiy aniqlangan
musbat aniqlangan
ishora aniqlanmagan
toq aniqlangan

26. Nuqtalar o'rnini to'ldiring: $A=(a_{ij})$ matritsaning ketma-ket joylashgan bosh minorlari qat'iy musbat sonlar ketma-ketligini tashkil qilganda va faqat shundagina, bu matritsa ..... bo'ladi.
musbat aniqlangan
manfiy aniqlangan
ishora aniqlanmagan
juft aniqlangan

27. $f(x_1,x_2,x_3)=x_1+2x_3+x_2x_3-x_1^2-x_2^2-x_3^2$ funksiyaninf statsionar nuqtasini toping.
$\left(\frac{1}{2};\frac{2}{3};\frac{4}{3}\right)$
$\left(\frac{1}{2};\frac{1}{2};\frac{4}{3}\right)$
$\left(\frac{1}{2};\frac{2}{3};\frac{2}{3}\right)$
$\left(\frac{3}{2};\frac{2}{3};\frac{4}{3}\right)$

28. Agar $\Delta=B^2-AC<0$ bo'lsa, ...
statsionar nuqta funksiyaning lokal ekstremum nuqtasi bo'ladi.
statsionar nuqta ekstremum nuqta bo'lmaydi.
ekstremum nuqtasi bo'lishi ham, bo'lmasligi ham mumkin.

statsionar nuqta mavjud bo’lmaydi.

29. Agar $B^2 - AC > 0$ bo‘lsa, ...
statsionar nuqta ekstremum nuqta bo‘lmaydi.
statsionar nuqta funksiyaning lokal ekstremum nuqtasi bo‘ladi.
statsionar nuqta mavjud bo’lmaydi.
ekstremum nuqtasi bo‘lishi ham, bo‘lmasligi ham mumkin.

30. Agar $B^2 - AC = 0$ bo‘lsa, ...
ekstremum nuqtasi bo‘lishi ham, bo‘lmasligi ham mumkin.
statsionar nuqta mavjud bo’lmaydi.
statsionar nuqta funksiyaning lokal ekstremum nuqtasi bo‘ladi.
statsionar nuqta ekstremum nuqta bo‘lmaydi.

“IQTISODCHILAR UCHUN MATEMATIKA”
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I. Chiziqsiz programmalashtirish masalasi

1.

Chiziqsiz programmalashtirish masalasining qabul qilinadigan yechimlari to’plami …
Qavariq yoki qavariq bo’lmagan to’plam bo’lishi mumkin.
Har doim qavariq to’plam bo’ladi.
Har doim qavariq bo’lmagan to’plam bo’ladi.
Har doim chegarallanmagan to’plam bo’ladi.

2.

Chiziqsiz programmalashtirish masalasidagi maqsad funksiya …
Mumkin bo’lgan yechimlar soha ichida yoki chegarasida o’zining ekstremumiga erishadi.
O’zining ekstremumiga faqat mumkin bo’lgan yechimlar sohasining ichida erishadi.
O’zining ekstremumiga faqat mumkin bo’lgan yechimlar sohasining chegarasida erishadi.
To’g’ri javob yo’q

3.

Chiziqsiz programmalashtirish masalasida cheklovlar …
Chiziqli yoki chiziqsiz munosabatlarni o’z ichiga oladi.
Faqat chiziqsiz munosabatlarni o’z ichiga oladi.
Faqat chiziqli munosabatlarni o’z ichiga oladi.
Faqat chiziqsiz tenglamalarni o’z ichiga oladi.

4.

Chiziqsiz programmalashtirish masalalarida mumkin bo’lgan yechimlar to’plami ...
Qavariq yoki qavariq bo’lmagan to’plam bo’lishi mumkin.
Har doim qavariq bo’lmagan to’plam bo’ladi.
Har doim qavariq to’plam bo’ladi.
Har doim chegaralangan to’plam bo’ladi.

5.

Hozirgi davrgacha eng yaxshi o’rganilgan chiziqsiz programmalashtirish masalalari qaysi?
Qavariq programmalashtirish masalasi
Kvadratik programmalashtirish masalasi
Separabel programmalashtirish masalasi
Dinamik programmalashtirish masalasi

6.

Iqtisodiy amaliyotda ko'p uchraydigan chiziqsiz programmalashtirish masalalari qaysi?
Kvadratik programmalashtirish masalasi
Qavariq programmalashtirish masalasi
Stoxastik programmalashtirish masalasi
Separabel programmalashtirish masalasi

7.

Chegaraviy shartlari qatnashmagan matematik programmalashtirish masalasi qanday turdagi masala deb yuritiladi?
Shartsiz optimallashtirish masalasi
Shartli optimallashtirish masalasi
Optimallashtirishning klassik masalasi
Dinamik programmalashtirish masalasi

8.

Berilgan masalalardan qaysi biri chiziqsiz programmalashtirish masalasi bo'ladi.
$F = x_1^2 + 8x_2^2 \to \max$ $\begin{cases} 8x_1 + 5x_2 \le 21 \\ 3x_1 + 7x_2 \ge 4 \\ x_1 \ge 0,\ x_2 \ge 3 \end{cases}$
$F = 6x_1 + 8x_2 \to \min$ $\begin{cases} 2x_1 + 5x_2 \le 12 \\ 5x_1 - x_2 \ge 2 \\ x_1 \ge 0,\ x_2 \ge 0 \end{cases}$
$F = 4x_1 + 2x_2 \to \max$ $\begin{cases} 2x_1 - x_2 \ge 3 \\ 3x_1 + 7x_2 \le 14 \\ x_1 \ge 2,\ x_2 \ge 4 \end{cases}$
$F = 10x_1 + 18x_2 \to \max$ $\begin{cases} x_1 + x_2 \le 32 \\ 5x_1 - 2x_2 \ge 9 \\ x_1 \ge 7,\ x_2 \ge 3 \end{cases}$

9.

Berilgan masalalardan qaysi biri chiziqsiz programmalashtirish masalasi bo'ladi.
$F = 10x_1 + 18x_2 \to \max$ $\begin{cases} x_1 + x_2 \le 32 \\ 5x_1 - 2x_2 \ge 9 \\ x_1 \ge 7,\ x_2 \ge 3 \end{cases}$
$F = 3x_1 + x_2 \to \max$ $\begin{cases} 3x_1 + 15x_2 \le 120 \\ 3x_1 + 7x_2 \ge 4 \\ x_1 \ge 0,\ x_2 \ge 0 \end{cases}$
$F = x_1 + 8x_2 \to \max$ $\begin{cases} 8x_1 + 5x_2 \le 21 \\ 5x_1 - x_2 \ge 34 \\ 0 \le x_1 \le 14,\ x_2 \ge 0 \end{cases}$
$F = 13x_1 + 38x_2 \to \min$ $\begin{cases} 8x_1 + 5x_2 \ge 30 \\ 3x_1 + 7x_2 \ge 44 \\ x_1 \ge 12,\ x_2 \ge 8 \end{cases}$

10.

Quyidagilardan qaysi biri chiziqsiz programmalashtirish masalasining modeli bo'ladi?
$F = 4x_1^2 + 9x_2^2 \to \min$ $\begin{cases} 8x_1^4 + 5x_2^2 \le 144 \\ 3x_1 + 7x_2 \ge 34 \\ x_1 \ge 0,\ x_2 \ge 1 \end{cases}$
$F = 6x_1 + 8x_2 \to \min$ $\begin{cases} 2x_1 + 5x_2 \le 12 \\ 5x_1 - x_2 \ge 2 \\ x_1 \ge 0,\ x_2 \ge 0 \end{cases}$
$F = 4x_1 + 2x_2 \to \max$ $\begin{cases} 2x_1 - x_2 \ge 3 \\ 3x_1 + 7x_2 \le 14 \\ x_1 \ge 2,\ x_2 \ge 4 \end{cases}$
$F = 10x_1 + 18x_2 \to \max$ $\begin{cases} x_1 + x_2 \le 32 \\ 5x_1 - 2x_2 \ge 9 \\ x_1 \ge 7,\ x_2 \ge 3 \end{cases}$

11.

Chiziqsiz programmalashtirish masalasini ko'rsating.
$F = 10x_1^2 + 18x_2^4 \to \max$ $\begin{cases} x_1^2 + x_2 \le 32 \\ 5x_1 - 2x_2 \ge 3 \\ x_1 \ge 2,\ x_2 \ge 0 \end{cases}$
$F = 3x_2 + x_2 \to \min$ $\begin{cases} 3x_1 + 15x_2 \le 120 \\ 3x_1 + 7x_2 \ge 4 \\ x_1 \ge 0,\ \ x_2 \ge 0 \end{cases}$
$F = x_1 + 8x_2 \to \max$ $\begin{cases} 8x_1 + 5x_2 \le 21 \\ 5x_1 - x_2 \ge 34 \\ 0 \le x_1 \le 14,\quad x_2 \ge 0 \end{cases}$
$F = 13x_1 + 38x_2 \to \min$ $\begin{cases} 8x_1 + 5x_2 \ge 30 \\ 3x_1 + 7x_2 \ge 44 \\ x_1 \ge 12,\ \ x_2 \ge 8 \end{cases}$

12.

Berilgan masalalardan qaysi biri chiziqsiz programmalashtirish masalasi bo'ladi?
$F = 7x_1 + 3x_2 \to \max$ $\begin{cases} 8x_1^2 + 5x_2^2 \le 250 \\ 3x_1 + 7x_2 \ge 40 \\ x_1 \ge 0,\ \ x_2 \ge 3 \end{cases}$
$F = 6x_1 + 8x_2 \to \min$ $\begin{cases} 2x_1 + 5x_2 \le 12 \\ 5x_1 - x_2 \ge 2 \\ x_1 \ge 0,\ \ x_2 \ge 0 \end{cases}$
$F = 4x_1 + 2x_2 \to \max$ $\begin{cases} 2x_1 - x_2 \ge 3 \\ 3x_1 + 7x_2 \le 14 \\ x_1 \ge 2,\ \ x_2 \ge 4 \end{cases}$
$F = 10x_1 + 18x_2 \to \max$ $\begin{cases} x_1 + 3x_2 \le 32 \\ 5x_1 - 2x_2 \ge 9 \\ x_1 \ge 7,\ \ x_2 \ge 3 \end{cases}$

13.

Quyidagi matematik modellardan qaysi biri chiziqsiz programmalashtirish masalasi?
$F = 10x_1^2 + 18x_2^3 \to \max$ $\begin{cases} x_1^2 + x_2 \le 32 \\ 5x_1 - 2x_2 \ge 9 \\ x_1 \ge 7,\ x_2 \ge 3 \end{cases}$
$F = 3x_1 + x_2 \to \max$ $\begin{cases} 3x_1 + 15x_2 \le 120 \\ 3x_1 + 7x_2 \ge 4 \\ x_1 \ge 0,\ x_2 \ge 0 \end{cases}$
$F = x_1 + 8x_2 \to \max$ $\begin{cases} 8x_1 + 5x_2 \le 21 \\ 5x_1 - x_2 \ge 34 \\ 0 \le x_1 \le 14,\ x_2 \ge 0 \end{cases}$
$F = 13x_1 + 38x_2 \to \min$ $\begin{cases} 8x_1 + 5x_2 \ge 30 \\ 3x_1 + 7x_2 \ge 44 \\ x_1 \ge 12,\ x_2 \ge 8 \end{cases}$

14.

Quyidagi masalaning mumkin bo'lgan yechimlar to'plamiga qaysi nuqta kirmaydi? $F = 5x_1^2 + x_2^2 \to \min$ $\begin{cases} x_1^2 - x_2^3 \ge 3 \\ 3x_1 + 2x_2 \le 14 \\ x_1 \ge 2,\ x_2 \ge 0 \end{cases}$
A(2;2)
B(3;1)
C(4;1)
D(2;0)

15.

Quyidagi masalaning mumkin bo'lgan yechimlar to'plamiga qaysi nuqta kiradi? $F = 4x_1^2 + 2x_2^2 \to \max$ $\begin{cases} 2x_1^2 - x_2 \ge 3 \\ 3x_1 + 7x_2 \le 14 \\ x_1 \ge 2,\ x_2 \ge 1 \end{cases}$
A(2;1)

B(3;1)
C(2;0)
D(2;2)

“IQTISODCHILAR UCHUN MATEMATIKA”
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II. Lagranj ko’paytuvchilar usuli

1.

Lagranj ko’paytuvchilar usuli …
ko’p o’zgaruvchili funksiyaning shartli ekstremumini topish uchun ishlatiladi.
ko’p o’zgaruvchili funksiyaning aniqlanish sohasini topish uchun ishlatiladi.
ko’p o’zgaruvchili funksiyaning qiymatlar to’plamini topish uchun ishlatiladi.
ko’p o’zgaruvchili funksiyaning shartsiz ekstremumini topish uchun ishlatiladi.

2.

Lagranj ko’paytuvchilari … bo’lishi mumkin.
ixtiyoriy haqiqiy sonlar.
faqat manfiy sonlat
faqat butun sonlar.
faqat natural sonlar.

3.

Nima uchun Lagranj ko’paytuvchilari usuli qo’llaniladi?
Ko’p o’zgaruvchili funksiyalarning shartli ekstremumlarini topish uchun.
Ko’p o’zgaruvchili funksiyaning aniqlanish sohasini topish uchun.
Ko’p o’zgaruvchili funksiyaning qiymatlar to’plamini topish uchun.
Ko’p o’zgaruvchili funksiyaning shartsiz ekstremumlarini topish uchun.

4.

Quyidagi masalaning Lagranj funksiyasini ko’rsating: $$F = x_1^2 + x_2^2 \to extrem$$ $$3x_1 + 2x_2 = 11$$
$L = x_1^2 + x_2^2 + \lambda(3x_1 + 2x_2 - 1)$
$L = x_1^2 + x_2^2 + \lambda(3x_1 + 2x_2)$
$L = x_1^2 + x_2^2 + \lambda 3x_1$
$L = x_1^2 + x_2^2 + \lambda 2x_2$

5.

Quyidagi masalaning Lagranj funksiyasini ko’rsating: $$F = 3x_1^2 + x_2^2 \to extrem$$ $$6x_1 + 4x_2 = 22$$
$L = 3x_1^2 + x_2^2 + \lambda(6x_1 + 4x_2 - 22)$
$L = \lambda(6x_1 + 4x_2 - 22)$
$L = 3x_1^2 + x_2^2 - \lambda(6x_1 + 4x_2 - 22)$
$L = 3x_1^2 + x_2^2 + 6x_1 + 4x_2 - 22$

6.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = x_1 - 2x_2 + 2x_3 \to extrem$$ $$x_1^2 + x_2^2 + x_3^2 = 1$$
$L = x_1 - 2x_2 + 2x_3 + \lambda(x_1^2 + x_2^2 + x_3^2 - 1)$
$L = x_1 - 2x_2 + 2x_3 + \lambda(x_1 - 2x_2 + 2x_3)$
$L = \lambda_1 x_1 - 2\lambda_2 x_2 + 2\lambda_3 x_3$
$L = x_1^2 + x_2^2 + x_3^2 + \lambda(x_1 - 2x_2 + 2x_3)$

7.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = 5 - 3x - 4y \to extrem$$ $$x^2 + y^2 = 25$$
$L = 5 - 3x - 4y + \lambda(x^2 + y^2 - 25)$
$L = \lambda(5 - 3x - 4y) + x^2 + y^2$
$L = 5 - 3x - 4y - \lambda(x^2 + y^2 - 25)$
$L = 5 - 3x - 4y + x^2 + y^2 - 25$

8.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = x_1^2 + 12x_1x_2 + 2x_2^2 \to extrem$$ $$4x_1^2 + x_2^2 = 25$$
$L = x_1^2 + 12x_1x_2 + 2x_2^2 + \lambda(4x_1^2 + x_2^2 - 25)$
$L = x_1^2 + 12x_1x_2 + 2x_2^2 + 4x_1^2 + x_2^2 - 25$
$L = x_1^2 + 12x_1x_2 + 2x_2^2 - \lambda(4x_1^2 + x_2^2 - 25)$
$L = \lambda(4x_1^2 + x_2^2 - 25)$

9.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = x_1^2 + 2x_1x_2 + 2x_2^2 \to extrem$$ $$3x_1^2 + x_2^2 = 12$$
$L = x_1^2 + 2x_1x_2 + 2x_2^2 + \lambda(3x_1^2 + x_2^2 - 12)$
$L = x_1^2 + 2x_1x_2 + 2x_2^2 + 3x_1^2 + x_2^2 - 12$
$L = x_1^2 + 2x_1x_2 + 2x_2^2 - \lambda(3x_1^2 + x_2^2 + 12)$
$L = \lambda(3x_1^2 + x_2^2 - 12)$

10.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = x_1 + 2x_2 \to extrem$$ $$\begin{cases} x_1 + x_2^2 = 2 \\ x_1 x_2 = 1 \end{cases}$$
$L = x_1 + 2x_2 + \lambda_1(x_1 + x_2^2 - 2) + \lambda_2(x_1 x_2 - 1)$
$L = x_1 + 2x_2 + \lambda_1(x_1 + x_2^2 + 2) + \lambda_2(x_1 x_2 + 1)$
$L = x_1 + 2x_2 + \lambda_1(x_1 + x_2^2) + \lambda_2 x_1 x_2$
$L = \lambda_1(x_1 + 2x_2) + \lambda_2(x_1 + x_2^2 - 2) + \lambda_3(x_1 x_2 - 1)$

11.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = x_1 x_2 \to extrem$$ $$\begin{cases} x_1 + 2x_2 = 5 \\ 3x_1 - x_2 = 4 \end{cases}$$
$L = x_1 x_2 + \lambda_1(x_1 + 2x_2 - 5) + \lambda_2(2x_1 - x_2 - 4)$
$L = x_1 x_2 + \lambda\,(x_1 + 2x_2 + 5) + \lambda(3x_1 - x_2 + 4)$
$L = \lambda x_1 x_2 + (x_1 + 2x_2 + 5) + (3x_1 - x_2 + 4)$
$L = x_1 x_2 - (x_1 + 2x_2 - 5) + (3x_1 - x_2 - 4)$

12.

Quyidagi masalaning Lagranj funksiyasini ko'rsating: $$F = x_1 x_2 x_3 \to extrem$$ $$\begin{cases} x_1^2 + x_2^2 + x_3^2 = 1 \\ x_1 + x_2 + x_3 = 0 \end{cases}$$
$L = x_1 x_2 x_3 + \lambda_1(x_1^2 + x_2^2 + x_3^2 - 1) + \lambda_2(x_1 + x_2 + x_3)$
$L = x_1 x_2 x_3 + \lambda\,(x_1^2 + x_2^2 + x_3^2 - 1 + x_1 + x_2 + x_3)$
$L = \lambda_1(x_1^2 + x_2^2 + x_3^2 - 1) + \lambda_2(x_1 + x_2 + x_3)$
$L = x_1 x_2 x_3 - \lambda_1(x_1^2 + x_2^2 + x_3^2 - 1) - \lambda_2(x_1 + x_2 + x_3)$

Tuzuvchi: **PhD. Sotvoldiyev A.I.**

1. https://azimjonbek.github.ioQavariq to`plamning chetki nuqtalarini toping $\begin{cases} x-y\geq -2 \\ x\leq 0, y\geq 0 \end{cases}$
(-2;0), (0;2), (0;0)
(2;0), (0;-2), (0;0)
(-2;0), (0;2)
(-2;0), (0;0) (0;-2)

2. Quyidagi sohalar bilan chegaralangan to`plamning qaysi biri qavariq to`plam bo`lmaydi
$y\leq 3x^2$
$(x-3)^2+y^2\leq 4$
$2x-y\geq 3$
$\begin{cases} x+y\leq 1 \\ x\geq 0, y\geq 0 \end{cases}$

3. Quyidagi nuqtalarning qaysi biri $A(0;1;2)$ nuqtaning $r=3$ atrofiga tegishli
$(1;1;1)$
$(2;3;0)$
$(3;2;0)$
$(-1;3;-1)$

4. Qavariq to`plamning chetki nuqtalarini toping. $\begin{cases} 2x_1+3x_2\leq 6 \\ x_1\geq 0, x_2\geq 0 \end{cases}$
$(0;0),(0;2),(3;0)$
$(0;0),(2;0),(0;3)$
$(0;0),(3;2),(2;3)$
To`g`ri javob yo`q

5. Quyidagi sohalar bilan chegaralangan to`plamlarda qaysi biri qavariq to`plam
$\frac{x^2}{3}+\frac{y^2}{4}\leq 1$
$y\leq 4x^2$
$x^2+y^2\geq 9$
$\frac{x^2}{25}+\frac{y^2}{16}\geq 1$

6. Quyidagi sohalar bilan chegaralangan to`plamlardan qaysi biri qavariq to`plam.
$\begin{cases} x+y \le 2 \\ x^2+y^2 \le 1 \end{cases}$
$\begin{cases} y \le x^2 \end{cases}$
$\begin{cases} -x-y \ge 1 \\ x+y \ge 1 \end{cases}$
$\begin{cases} -x-y \le -4 \\ x+y \le 1 \end{cases}$

7.Quyidagi nuqtalarning qaysi biri A(0;0;0) nuqtaning r=5 atrofida yotadi
(2;3;3)
(2;3;4)
(2;-3;4)
(-2;3-4)

8.Qavariq to`plamning chetki nuqtalarini toping $\begin{cases} 3x+4y \ge 24 \\ x \ge 0, y \ge 0 \end{cases}$
(0;6), (8;0)
(0;6), (8;0), (0;0)
(6;0), (0;8)
(6;0), (0;0), (0;8)

9.Quyidagi nuqtalarning qaysi biri O (-2;1) nuqtaning r=3 atrofiga tegishli emas
(1;2)
(0;0)
(-2;3)
(-1;1)

10.Qavariq to`plamning chetki nuqtalarini toping $\begin{cases} x-y \le -3 \\ x \le 0, y \ge 0 \end{cases}$
(-3;0), (0;3)
(0;-3), (3;0)

(-3;0), (0;3) (0;0)
(0;-3), (3;0) (0;0)

11.Quyidagi nuqtalarning qaysi biri O (2;1) nuqtaning r=2 atrofiga tegishli?
(1;1)
(0;0)
(3;3)
(0;2)

12.Quyidagi sohalar bilan chegaralangan to`plamlardan qaysi biri qavariq to`plam
$\begin{cases} x+y \le 2 \\ x^2+y^2 \le 1 \end{cases}$
$\begin{cases} -x-y \ge 1 \\ x+y \ge 1 \end{cases}$
$\begin{cases} -x-y \le -2 \\ x+y \le 1 \end{cases}$
$\begin{cases} y = x^2 \end{cases}$

13.Quyidagi nuqtalarning qaysi biri A(0;0;0) nuqtaning r=5 atrofida yotadi?
(2;2;3)
(3;3;4)
(3;-3;4)
(-2;3-4)

14.Qavariq to`plamning chetki nuqtalarini toping. $\begin{cases} 4x_1+6x_2 \le 12 \\ x_1 \ge 0, x_2 \ge 0 \end{cases}$
$(0;0),(0;2),(3;0)$
$(0;0),(4;0),(0;6)$
$(0;0),(3;2),(2;3)$
To`g`ri javob yo`q

15.Qavariq to`plamning chetki nuqtalarini toping $\begin{cases} 6x-4y \le 12 \\ x \ge 0, y \le 0 \end{cases}$
$(0;-3),(2;0),(0;0)$
$(0;-3),(2;0)$
$(-6;0),(0;4)$
$(-3;0),(0;2),(0;0)$

16.Quyidagi nuqtalarning qaysi biri $A(0;1;2)$ nuqtaning $r=3$ atrofiga tegishli.
$(1;1;1)$
$(2;3;0)$
$(3;2;0)$
$(-1;3;-1)$

17.Qavariq to`plamning chetki nuqtalarini toping $\begin{cases} 2x-2y \ge -4 \\ x \le 0, y \ge 0 \end{cases}$
(-2;0), (0;2), (0;0)
(2;0), (0;-2), (0;0)
(-2;0), (0;4)
(-2;0), (0;0) (0;4)

18.Chegaralanmagan sonli ketma-ketlikni toping
$y_n = \frac{2n^2-1}{4n+4}$
$y_n = \frac{3n+8}{2n-1}$
$y_n = \frac{13n^2-1}{4n^2+8}$
$y_n = \frac{6(n-1)^3}{2+n^3}$

19.Limitni toping $\lim\limits_{n\to\infty} \frac{\sqrt[3]{n^2+3n}}{3n+3}$
0

$\frac{1}{2}$
∞
$-\frac{2}{3}$

20.Limitni toping $\lim\limits_{n\to\infty}\frac{1+\frac{1}{4}+...+\frac{1}{4^n}}{1+\frac{1}{9}+...+\frac{1}{9^n}}$
$\frac{32}{27}$
$\frac{27}{32}$
$\frac{3}{2}$
$\frac{2}{3}$

21.Limitni toping $\lim\limits_{n\to\infty}(n+1)(\cos n-2)$
$-\infty$
∞
1
mavjud emas

22.Limitni toping $\lim\limits_{n\to\infty}\frac{\sqrt[3]{8n^3+2n^2-1}}{2n+5}$
1
∞
$\sqrt[3]{2}$
0

23.Limitni toping $\lim\limits_{n\to\infty}\left(\frac{2\sqrt{n+1}}{n+3};\frac{4n^2+1}{12n^2+1}\right)$
$\left(0;\frac{1}{3}\right)$
(1;-1)

(0;-1)
$\left(1;\frac{1}{3}\right)$

24.. Limitni toping $\lim\limits_{n\to\infty}\frac{\sin\left(n^2+2n+1\right)}{6}$
mavjud emas
$\frac{1}{3}$
0
$-\frac{1}{3}$

25.Qaysi ketma-ketlikning limiti mavjud emas?
$b_n=3+(-1)^{n-1}$
$b_n=\frac{\sqrt{n^2+3}}{3n-1}$
$b_n=\sqrt[3]{\frac{4n^2+3n}{9-n^2}}$
$b_n=\frac{4\cos n^2}{n^2+1}$

26.Qaysi ketma-ketlikning limiti mavjud emas?
$b_n=2+(-1)^{n-3}$
$b_n=\frac{\sqrt{n^2+3}}{2n-1}$
$b_n=\sqrt[3]{\frac{4n^2+3n}{6-n^2}}$
$b_n=\frac{\cos n^2}{n^2+1}$

27.Funksiyalarning ymumiy davrini toping $y=3^{\sin x}, y=3^{\cos 2x}$
2π
3π
$\frac{4\pi}{3}$
π

28.Funksiyaning asosiy davrini toping $y=2\cos^2 3x$
$\frac{\pi}{3}$
$\frac{2\pi}{3}$
π
$\frac{\pi}{6}$

29.Funksiyaning qiymatlar to`plamini toping $y=3\sin x-4\cos x$
$[-5;5]$
$[-2;2]$
$[-1;1]$
$(-\sqrt{2};\sqrt{2})$

30.Funksiyaning qiymatlar to`plamini toping $y=\sin x-\cos x$
$[-\sqrt{2};\sqrt{2}]$
$[-2;2]$
$[-1;1]$
$(-\sqrt{2};\sqrt{2})$