24/ $f(x) = x^k \cdot e^{kx}$ funksiyasının törəməsini tapın. $k=\overline{1,30}$, $k=5$.

$$f'(x) = (x^5 e^{5x})' = (x^5)' e^{5x} + x^5 \cdot (e^{5x})' = 5x^4 e^{5x} + x^5 \cdot 5e^{5x} =$$

$$= 5x^4 e^{5x} (1+x)$$

25/ $f(x) = \frac{\sin kx}{x} + kx$ olarsa, $f'(x)$ törəmsini tap. $k=\overline{1,30}$, $k=5$.

$$f'(x) = \left(\frac{\sin 5x}{x}\right)' + (5x)' = \frac{5\cos 5x \cdot x + \sin 5x}{x^2} + 5$$

26/ Lopital qaydasına görə limiti hesablayın. $k=\overline{1,30}$, $k=5$

$$\lim_{x\to 0} \frac{1-\cos kx}{2x^2} = \lim_{x\to 0} \frac{1-\cos 5x}{2x^2} = \left[\frac{0}{0}\right] = \lim_{x\to 0} \frac{(1-\cos 5x)'}{(2x^2)'} =$$

$$= \lim_{x\to 0} \frac{5\sin 5x}{4x} = \left[\frac{0}{0}\right] = \lim_{x\to 0} \frac{25\cos 5x}{4} = \frac{25}{4}$$

27/ $f(x) = 5^{kx^3+3x^2}$ funk.-un törəmsini tap. $k=\overline{1,30}$, $k=5$.

$$f'(x) = \left(5^{5x^3+3x^2}\right)' = 5^{5x^3+3x^2} \ln 5 \cdot (5x^3+3x^2)' =$$

$$= 5^{5x^3+3x^2} \cdot \ln 5 \cdot (15x^2+6x)$$

21/ Ardıcıllığın limitini hesablayın. $x=\overline{1,30}$ $x=5$.

$$\lim_{n\to\infty}\frac{xn^2-3n+2}{1-2n+5n^2}=\lim_{n\to\infty}\frac{5n^2-3n+2}{1-2n+5n^2}=\lim_{n\to\infty}\frac{5-\frac{3}{n}\to 0+\frac{2}{n^2}\to 0}{\frac{1}{n^2}\to 0-\frac{2}{n}\to 0+5}=$$

$$=\frac{5}{5}=1.$$

22/ Funksiyanın təyin oblastını tapın. $x=\overline{1,30}$, $x=5$

$$f(x)=\sqrt{x^2-4}+\sqrt{x+x}=\sqrt{x^2-4}+\sqrt{5+x}$$

$x^2-4\geq 0$

$(x-2)(x+2)\geq 0.$

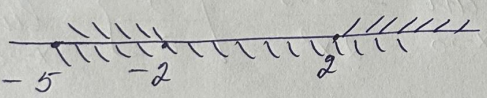
$x=2 \quad x=-2.$

$(-\infty;-2]\cup[2;\infty$

$5+x\geq 0$

$x\geq -5$

$[-5;\infty)$



$D(f)=[-5;-2]\cup[2;\infty)$

23/ Funksiyanın limitini hesablayın. $K=\overline{1,30}$
$K=5$.

$$\lim_{x\to 0}\frac{1-\cos 2x}{x\cdot\sin x}=\lim_{x\to 0}\frac{1-\cos 2x}{5x\cdot\sin x}=\lim_{x\to 0}\frac{2\sin^2 x}{5x\cdot\sin x}=$$

$$=\frac{2}{5}\lim_{x\to 0}\frac{\sin x}{x}=\frac{2}{5}\cdot 1=\frac{2}{5}$$

28/ $f(x)=\sin kx\cdot\cos x$ funk-nin diferensialen tap. $k=\overline{1,30}$, $k=5$

$$d(f(x))=(\sin 5x\cos x)'dx=\big(5\cos 5x\cdot\cos x+\sin 5x\cdot(-\sin x)\big)dx$$

29/ $f(x)=(x^2+x+1)^k$ funk-nin törəməsini hesab. $k=\overline{1,30}$ $k=5$

$$f'(x)=\big((x^2+x+1)^5\big)'=5(x^2+x+1)^4(x^2+x+1)'=$$
$$=5(x^2+x+1)^4(2x+1)$$

30 $y=\sin^2 kx$ funk-nin II tərtib törəmələri tap. $k=\overline{1,5}$, $k=5$

$$y'=(\sin^2 5x)'=2\sin 5x\cdot(\sin 5x)'=2\cdot\sin 5x\cdot 5\cos 5x=$$
$$=5\cdot 2\sin 5x\cos 5x=5\cdot\sin 10x$$
$$y''=(y')'=(5\sin 10x)'=50\cos 10x$$

31 $f(x)=x^3\log_2 kx$ funksiyasının diferensialını tap. $k=\overline{1,30}$ $k=5$.

$$d(f(x))=(x^3\log_2 5x)'dx=\left(3x^2\log_2 5x+x^3\cdot\frac{1}{5x\ln 2}\cdot(5x)'\right)dx$$
$$=\left(3x^2\log_2 5x+\frac{x^2}{\ln 2}\right)dx$$

28/ $f(x) = \sin kx \cdot \cos x$ funk-nin diferensialen tap. $k=\overline{1,30}$, $k=5$

$$d(f(x)) = (\sin 5x \cos x)' dx = (5\cos 5x \cdot \cos x + \sin 5x \cdot (-\sin x))\, dx$$

29/ $f(x) = (x^2+x+1)^k$ funk-nin törəmisini hesab. $k=\overline{1,30}$ $k=5$

$$f'(x) = ((x^2+x+1)^5)' = 5(x^2+x+1)^4 (x^2+x+1)' =$$
$$= 5(x^2+x+1)^4 (2x+1)$$

30 $y = \sin^2 kx$ funk-nin II tərtib törəmisini tap. $k=\overline{1,5}$, $k=5$

$$y' = (\sin^2 5x)' = 2\sin 5x \cdot (\sin 5x)' = 2 \cdot \sin 5x \cdot 5\cos 5x =$$
$$= 5 \cdot 2 \sin 5x \cos 5x = 5 \cdot \sin 10x$$
$$y'' = (y')' = (5\sin 10x)' = 50\cos 10x$$

31 $f(x) = x^3 \log_2 kx$ funksiyasının diferensialını tap. $k=\overline{1,30}$ $k=5$.

$$d(f(x)) = (x^3 \log_2 5x)' dx = \left(3x^2 \log_2 5x + x^3 \cdot \frac{1}{5x \ln 2} \cdot (5x)'\right) dx$$
$$= \left(3x^2 \log_2 5x + \frac{x^2}{\ln 2}\right) dx$$

24/ $f(x) = x^k \cdot e^{kx}$ funksiyasının törəmsini tapın. $k=\overline{1,30}$, $k=5$.

$$f'(x) = (x^5 e^{5x})' = (x^5)' e^{5x} + x^5 \cdot (e^{5x})' = 5x^4 e^{5x} + x^5 \cdot 5e^{5x} =$$

$$= 5x^4 e^{5x} (1+x)$$

25/ $f(x) = \frac{\sin kx}{x} + kx$ olarsa, $f'(x)$ törəmsini tap. $k=\overline{1,30}$, $k=5$.

$$f'(x) = \left(\frac{\sin 5x}{x}\right)' + (5x)' = \frac{5\cos 5x \cdot x + \sin 5x}{x^2} + 5$$

26/ Lopital qaydasına görə limiti hesablayın. $k=\overline{1,30}$, $k=5$

$$\lim_{x\to 0} \frac{1-\cos kx}{2x^2} = \lim_{x\to 0} \frac{1-\cos 5x}{2x^2} = \left[\frac{0}{0}\right] = \lim_{x\to 0} \frac{(1-\cos 5x)'}{(2x^2)'} =$$

$$= \lim_{x\to 0} \frac{5\sin 5x}{4x} = \left[\frac{0}{0}\right] = \lim_{x\to 0} \frac{25\cos 5x}{4} = \frac{25}{4}$$

27/ $f(x) = 5^{kx^3+3x^2}$ funk.-nun törəmsini tap. $k=\overline{1,30}$, $k=5$.

$$f'(x) = \left(5^{5x^3+3x^2}\right)' = 5^{5x^3+3x^2} \ln 5 \cdot (5x^3+3x^2)' =$$

$$= 5^{5x^3+3x^2} \cdot \ln 5 \cdot (15x^2+6x)$$

35/ $\int \sin kx \cos kx\,dx$ qeyri müəyyən inteq. tap. $k=\overline{1,30}$ $k=5$

$$\int \sin 5x \cos 5x\,dx = \int \frac{1}{2}\sin 10x\,dx = \frac{1}{2}\int \sin 10x\,dx =$$

$$= -\frac{1}{2}\cdot\frac{1}{10}\cos 10x + C = -\frac{1}{20}\cos 10x + C.$$

36/ $\int x\cdot e^{kx}dx$ qeyri müəyyən inteq. hesab. $k=\overline{1,30}$ $k=5$.

$$\int x\cdot e^{5x}dx = \left[\begin{matrix} u=x & dv=e^{5x}dx \\ du=dx & v=\frac{1}{5}e^{5x}\end{matrix}\right] =$$

$$= \frac{1}{5}xe^{5x} - \frac{1}{5}\int e^{5x}dx = \frac{1}{5}xe^{5x} - \frac{1}{25}e^{5x} + C.$$

37/ $y=kx-1$, $y=0$, $x=3$, $x=4$ xətləri ilə əhatə olunan fiqurun sahəsini tapın. $k=\overline{1,30}$ $k=5$

$$S = \int_3^4 (5x-1)\,dx = \int_3^4 5x\,dx - \int_3^4 x\,dx = 5\cdot\frac{x^2}{2}\Big|_3^4 - x\Big|_3^4 =$$

$$= \left(\frac{5\cdot 16}{2} - \frac{5\cdot 9}{2}\right) - (4-3) = 40 - \frac{45}{2} - 1 = \frac{33}{2}.$$

34/ $f(x) = kx^3 - 3kx^2 + 5$ funksiyasi ekstremumlarini toping.

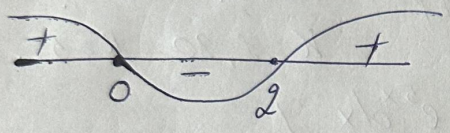
$x = \overline{1,30}$ $x = 5$.

$f(x) = 5x^3 - 15x^2 + 5$

$f'(x) = 15x^2 - 30x = 0$

$15x(x-2) = 0$

$\boxed{x = 0 \quad x = 2}$ funk-nin böhran nöqtələri.



$f'(-1) > 0$

$f'(1) < 0$

$f'(3) > 0$.

$\boxed{\begin{array}{l} x_{max} = 0 \\ x_{min} = 2 \end{array}}$ ekstremum nöqtəsidir.

$f_{max}(0) = 5 \cdot 0 - 15 \cdot 0 + 5 = 5$

$f_{min}(2) = 5 \cdot 8 - 15 \cdot 4 + 5 = -15$

$\boxed{\begin{array}{l} f_{max}(0) = 5 \\ f_{min}(2) = -15 \end{array}}$ funksiyanın ekstremumlarıdır.

32/ Funksiyani II tartib differensialini hap. $\overline{k=1,30}$ $k=5$

$$y = \ln\cos x + kx^3$$

$$dy = \left(\ln\cos x + 5x^3\right)' dx = \left(\frac{1}{\cos x}(\cos x)' + 15x^2\right) dx =$$

$$= \left(\frac{-\sin x}{\cos x} + 15x^2\right) dx = (-tgx + 15x^2) dx$$

$$d^2y = d(dy) = (-tgx + 15x^2)' dx^2 = \left(-\frac{1}{\cos^2 x} + 30x\right) dx^2$$

33/ $f(x) = kx^3 - 3x^2$ funk-nin artma va azalma oraliqlarini tapin. $\overline{k=1,30}$ $k=5$.

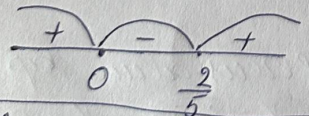
$f(x) = 5x^3 - 3x^2$

$f'(x) = 15x^2 - 6x$

$15x^2 - 6x > 0$

$3x(5x-2) > 0$

$x = 0 \quad x = \frac{2}{5}$

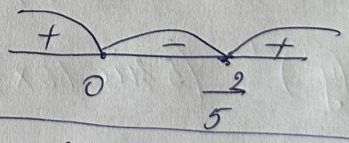


$(-\infty; 0) \cup \left(\frac{2}{5}; \infty\right)$ artma oraliq.

$15x^2 - 6x < 0$

$3x(5x-2) < 0$

$x = 0 \quad x = \frac{2}{5}$



$\left(0; \frac{2}{5}\right)$ azalma oraliq

35/ $\int \sin kx \cos kx\,dx$ deyi nüzyum int. lap.
$k=\overline{1,30}$ $k=5$

$$\int \sin 5x \cos 5x\,dx = \int \frac{1}{2}\sin 10x\,dx = \frac{1}{2}\int \sin 10x\,dx =$$
$$= \frac{1}{2}\cdot\frac{1}{10}\cos 10x + C = -\frac{1}{20}\cos 10x + C.$$

36/ $\int x\cdot e^{kx}dx$ deyi nüzyum intey. hesab.
$k=\overline{1,30}$ $k=5$

$$\int x\cdot e^{5x}dx = \left[\begin{matrix} u=x & dv=e^{5x}dx \\ du=dx & v=\frac{1}{5}e^{5x}\end{matrix}\right] =$$

$$= \frac{1}{5}x e^{5x} - \frac{1}{5}\int e^{5x}dx = \frac{1}{5}x e^{5x} - \frac{1}{25}e^{5x} + C.$$

37/ $y=kx-1$, $y=0$, $x=3$, $x=4$ xətlə ilə əhatə olunan fiqurun sahəsini tapın. $k=\overline{1,30}$ $k=5$

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$$= \left(\frac{5\cdot 16}{2} - \frac{5\cdot 9}{2}\right) - (4-3) = 40 - \frac{45}{2} - 1 = \frac{33}{2}.$$

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$$\int \sin 5x \cos 5x\,dx = \int \frac{1}{2}\sin 10x\,dx = \frac{1}{2}\int \sin 10x\,dx =$$

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$$= \left(\frac{5\cdot 16}{2} - \frac{5\cdot 9}{2}\right) - (4-3) = 40 - \frac{45}{2} - 1 = \frac{33}{2}.$$

34/ $f(x) = kx^3 - 3kx^2 + 5$ funksiyasini ekstremumlarini toping.

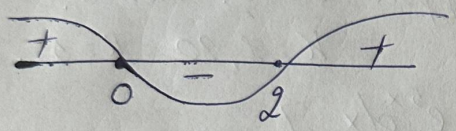
$k = \overline{1,30}$ $\quad k = 5$.

$f(x) = 5x^3 - 15x^2 + 5$

$f'(x) = 15x^2 - 30x = 0$

$15x(x-2) = 0$

$\boxed{x = 0 \quad x = 2}$ funk-nin böhran nöqtələri.



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$f_{max}(0) = 5 \cdot 0 - 15 \cdot 0 + 5 = 5$

$f_{min}(2) = 5 \cdot 8 - 15 \cdot 4 + 5 = -15$

$\boxed{\begin{array}{l} f_{max}(0) = 5 \\ f_{min}(2) = -15 \end{array}}$ funksiyanın ekstremumlarıdır.

38 $k=\overline{1,30}$ $k=5$

$\int \frac{dx}{x^2+k}$ => qeyri müəyyən ink. hesab.

$$\int \frac{dx}{x^2+5} = \int \frac{dx}{x^2+(\sqrt{5})^2} = \frac{1}{\sqrt{5}} \operatorname{arctg} \frac{x}{\sqrt{5}} + C$$

39 Qeyri müəyyən inteqrale tap: $k=\overline{1,30}$ $k=5$

$$\int \left(x^k + \frac{tgx}{\cos^2 x}\right) dx = \int \left(x^5 + \frac{tgx}{\cos^2 x}\right) dx =$$

$$= \int x^5 dx + \int tgx\, d(tgx) = \frac{x^6}{6} + \frac{tg^2 x}{2} + C$$

40/ Müəyyən inteqrale tap: $\int_2^3 \frac{x\,dx}{x^2+k}$, $k=\overline{1,30}$ $k=5$

$$\int_2^3 \frac{x\,dx}{x^2+5} = \frac{1}{2}\int_2^3 \frac{d(x^2+5)}{x^2+5} = \frac{1}{2} \ln|x^2+5| \Big|_2^3 =$$

$$= \frac{1}{2}\left(\ln(9+5) - \ln(4+5)\right) = \frac{1}{2}(\ln 14 - \ln 9) =$$

$$= \frac{1}{2} \ln \frac{14}{9}$$

41/ Müəyyən integral hesablayın: $\int_0^{\pi/2} x \sin^2 kx \, dx$, $k=\overline{1,30}$, $k=5$

$$\int_0^{\frac{\pi}{2}} 5\sin^2 5x\,dx = 5\int_0^{\frac{\pi}{2}} \frac{1-\cos 10x}{2}\,dx =$$

$$= 5\left(\int_0^{\frac{\pi}{2}} \frac{1}{2}\,dx - \frac{1}{2}\int_0^{\frac{\pi}{2}} \cos 10x\,dx\right) = 5\cdot\frac{1}{2}x\Big|_0^{\frac{\pi}{2}} +$$

$$+ \frac{1}{2}\cdot\frac{1}{10}\sin 10x\Big|_0^{\frac{\pi}{2}} = 5\cdot\frac{\pi}{4} - \frac{1}{20}\sin 5\pi + \frac{1}{20}\sin 0 =$$

$$= 5\cdot\frac{\pi}{4}$$

42 Müəyyən int. hesab. $k=\overline{1,30}$ $k=5$

$$\int_0^1 \sqrt{x^k}\,dx = \int_0^1 \sqrt{x^5}\,dx = \int_0^1 x^{\frac{5}{2}}\,dx = \frac{x^{\frac{5}{2}+1}}{\frac{5}{2}+1}\Big|_0^1 =$$

$$= \frac{2}{7}\sqrt{x^7}\Big|_0^1 = \frac{2}{7}(1-0) = \frac{2}{7}.$$

43/

38 $\int \frac{dx}{x^2+k}$ => дәрі шығуы мүм. болсын. $k=\overline{1,30}$ $k=5$

$$\int \frac{dx}{x^2+5} = \int \frac{dx}{x^2+(\sqrt{5})^2} = \frac{1}{\sqrt{5}} \operatorname{arctg} \frac{x}{\sqrt{5}} + C$$

39 Дәрі шығуы интеграл бар: $k=\overline{1,30}$ $k=5$

$$\int \left(x^k + \frac{tgx}{\cos^2 x}\right) dx = \int \left(x^5 + \frac{tgx}{\cos^2 x}\right) dx =$$

$$= \int x^5 dx + \int tgx\, d(tgx) = \frac{x^6}{6} + \frac{tg^2 x}{2} + C$$

40/ Шығуы интеграл бар: $\int_2^3 \frac{x\,dx}{x^2+k}$, $k=\overline{1,30}$, $k=5$

$$\int_2^3 \frac{x\,dx}{x^2+5} = \frac{1}{2}\int_2^3 \frac{d(x^2+5)}{x^2+5} = \frac{1}{2} \ln|x^2+5| \Big|_2^3 =$$

$$= \frac{1}{2}\left(\ln(9+5) - \ln(4+5)\right) = \frac{1}{2}(\ln 14 - \ln 9) =$$

$$= \frac{1}{2} \ln \frac{14}{9}$$

32/ Funksiyani II tartib differensialini top. $x=\overline{1,30}$ $x=5$

$y = \ln\cos x + 5x^3$

$dy = \left(\ln\cos x + 5x^3\right)' dx = \left(\frac{1}{\cos x}(\cos x)' + 15x^2\right) dx =$

$= \left(\frac{-\sin x}{\cos x} + 15x^2\right) dx = (-\operatorname{tg} x + 15x^2) dx$

$d^2y = d(dy) = (-\operatorname{tg} x + 15x^2)' dx^2 = \left(-\frac{1}{\cos^2 x} + 30x\right) dx^2$

33/ $f(x) = 5x^3 - 3x^2$ funk-nin artma va azalma oraliqlarini toping. $x=\overline{1,30}$ $x=5$.

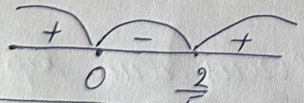
$f(x) = 5x^3 - 3x^2$

$f'(x) = 15x^2 - 6x$

$15x^2 - 6x > 0$

$3x(5x-2) > 0$

$x=0 \quad x=\frac{2}{5}$

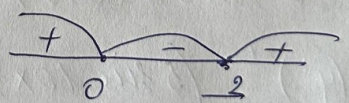


$(-\infty; 0) \cup \left(\frac{2}{5}; \infty\right)$ artma oraliq.

$15x^2 - 6x < 0$

$3x(5x-2) < 0$

$x=0 \quad x=\frac{2}{5}$



$\left(0; \frac{2}{5}\right)$ azalma oraliq.

41/ Müxtəlif üsulla həll: $\int_0^{\pi/2} x \sin^2 kx \, dx$, $k=\overline{1,30}$, $k=5$

$$\int_0^{\frac{\pi}{2}} 5\sin^2 5x\,dx = 5\int_0^{\frac{\pi}{2}} \frac{1-\cos 10x}{2}\,dx =$$

$$= 5\left(\int_0^{\frac{\pi}{2}} \frac{1}{2}\,dx - \frac{1}{2}\int_0^{\frac{\pi}{2}} \cos 10x\,dx\right) = 5\cdot\frac{1}{2}x\Big|_0^{\frac{\pi}{2}} +$$

$$+ \frac{1}{2}\cdot\frac{1}{10}\sin 10x\Big|_0^{\frac{\pi}{2}} = 5\cdot\frac{\pi}{4} - \frac{1}{20}\sin 5\pi + \frac{1}{20}\sin 0 =$$

$$= 5\cdot\frac{\pi}{4}$$

42 Müxtəlif üsulla həll. $k=\overline{1,30}$ $k=5$

$$\int_0^1 \sqrt{x^k}\,dx = \int_0^1 \sqrt{x^5}\,dx = \int_0^1 x^{\frac{5}{2}}\,dx = \frac{x^{\frac{5}{2}+1}}{\frac{5}{2}+1}\Big|_0^1 =$$

$$= \frac{2}{7}\sqrt{x^7}\Big|_0^1 = \frac{2}{7}(1-0) = \frac{2}{7}.$$

42/

43/ Integrum ist. hesab. $k = \overline{1,30}$

$$\int_1^3 \frac{k}{x^2} e^{\frac{k}{x}} dx = \int_1^3 \frac{5}{x^2} e^{\frac{5}{x}} dx = -\int_1^3 e^{\frac{5}{x}} d\left(\frac{5}{x}\right) =$$

$$= -e^{\frac{5}{x}} \Big|_1^3 = -e^{\frac{5}{3}} + e^5$$

$k=1,30 \quad k=5$

44/ $$\lim_{x\to 0} \frac{\sqrt{1+kx}-1}{2x} = \lim_{x\to 0} \frac{(\sqrt{1+5x}-1)(\sqrt{1+5x}+1}{2x(\sqrt{1+5x}+1)} =$$

$$= \lim_{x\to 0} \frac{1+5x-1}{2x(\sqrt{1+5x}+1)} = \lim_{x\to 0} \frac{5}{2(\sqrt{1+5x}+1)} =$$

$$= \frac{5}{2\cdot 2} = \frac{5}{4}$$

45/ Funksiyani maili asimp tap. $k=\overline{1,30}$ $\alpha = 5$

$$f(x) = \frac{x^2}{\alpha - x} = \frac{x^2}{5-x}$$

$$k = \lim_{x\to\infty} \frac{f(x)}{x} = \lim_{x\to\infty} \frac{x^2}{(5-x)\cdot x} = \lim_{x\to\infty} \frac{x}{5-x} = -1.$$

$$b = \lim_{x\to\infty} (f(x) - kx) = \lim_{x\to\infty} \left(\frac{x^2}{5-x} + x\right) = \lim_{x\to\infty} \frac{x^2+5x-x^2}{5-x} =$$

$$= \lim_{x\to\infty} \frac{5x}{5-x} = \lim_{x\to\infty} \frac{5}{\frac{5}{x}-1} = -5$$

$y = kx+b \Rightarrow \boxed{y = -x-5}$ düz xətti funksiyanın maili asimptotudur.

43/ Mizgum int. hesab. $k = \overline{1,30}$

$$\int_1^3 \frac{k}{x^2} e^{\frac{k}{x}} dx = \int_1^3 \frac{5}{x^2} e^{\frac{5}{x}} dx = -\int_1^3 e^{\frac{5}{x}} d\left(\frac{5}{x}\right) =$$

$$= -e^{\frac{5}{x}} \Big|_1^3 = -e^{\frac{5}{3}} + e^5$$

$k=1,30 \quad k=5$

44/ $$\lim_{x\to 0} \frac{\sqrt{1+kx}-1}{2x} = \lim_{x\to 0} \frac{(\sqrt{1+5x}-1)(\sqrt{1+5x}+1}{2x(\sqrt{1+5x}+1)} =$$

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$$= \frac{5}{2\cdot 2} = \frac{5}{4}$$

45/ Funksiyani maili asimptotlar. $k=1,30$ $\alpha = 5$

$$f(x) = \frac{x^2}{\alpha - x} = \frac{x^2}{5-x}$$

$$k = \lim_{x\to\infty} \frac{f(x)}{x} = \lim_{x\to\infty} \frac{x^2}{(5-x)\cdot x} = \lim_{x\to\infty} \frac{x}{5-x} = -1.$$

$$b = \lim_{x\to\infty} (f(x) - kx) = \lim_{x\to\infty} \left(\frac{x^2}{5-x} + x\right) = \lim_{x\to\infty} \frac{x^2+5x-x^2}{5-x} =$$

$$= \lim_{x\to\infty} \frac{5x}{5-x} = \lim_{x\to\infty} \frac{5}{\frac{5}{x}-1} = -5$$

$y = kx+b \Rightarrow \boxed{y = -x-5}$ dur xətti funksiyanın maili asimptotudur.

48/ $\int x \cos kx\, dx$ $\quad k = \overline{1,10}$ $\quad k=5$

$$\int x\cos 5x\,dx = \left[\begin{matrix} u = x & dV = \cos 5x\,dx \\ du = dx & V = \frac{1}{5}\sin 5x \end{matrix}\right] =$$

$$= \frac{1}{5}x\sin 5x - \frac{1}{5}\int \sin 5x\,dx = \frac{1}{5}x\sin 5x +$$

$$+ \frac{1}{25}\cos 5x + C$$

49/ $y = 4x^3 - kx^2 + 5$ $\quad k = \overline{1,30}$ $\quad k=5$

$y = 4x^3 - 5x^2 + 5$

$y' = 12x^2 - 10x$

$y'' = (y')' = 24x - 10.$

$f''(x) < 0.$

$24x - 10 < 0$

$24x < 10$

$x < \frac{10}{24} \Rightarrow x < \frac{5}{12}$

$(-\infty; \frac{5}{12})$ interval qabarıq lıq intervalıdır.

46/ Funksiyanın şaquli asimptotunu tap.

$$f(x)=\frac{4x^2}{x+k} \qquad k=\overline{1,30} \qquad k=5.$$

$$f(x)=\frac{4x^2}{x+5}$$

$x+5=0$

$x=-5.$

$$\lim_{x\to -5}\frac{4x^2}{x+5}=\frac{4\cdot(-5)^2}{-5+5}=\frac{100}{0}=\infty$$

$x=-5$ funksiyanın II növ kəsilmə nöqtəsidir.

Deməli $x=-5$ düz xətti funksiyanın şaquli asimptotudur.

47/ $\int x\sqrt{x^2+k}\,dx \qquad k=\overline{1,30} \qquad k=5$

$$\int x\sqrt{x^2+5}\,dx=\frac{1}{2}\int\sqrt{x^2+5}\,d(x^2+5)=$$

$$=\frac{1}{2}\,\frac{(x^2+5)^{\frac{1}{2}+1}}{\frac{1}{2}+1}=\frac{1}{2}\cdot\frac{2}{3}\sqrt{(x^2+5)^3}+C=$$

$$=\frac{\sqrt{(x^2+5)^3}}{3}+C.$$

46/ Funksiyani şaquli asimptotunu tap.

$$f(x)=\frac{4x^2}{x+k} \qquad k=\overline{1,30} \qquad k=5.$$

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$$\int x\sqrt{x^2+5}\,dx=\frac{1}{2}\int\sqrt{x^2+5}\,d(x^2+5)=$$

$$=\frac{1}{2}\,\frac{(x^2+5)^{\frac{1}{2}+1}}{\frac{1}{2}+1}=\frac{1}{2}\cdot\frac{2}{3}\sqrt{(x^2+5)^3}+C=$$

$$=\frac{\sqrt{(x^2+5)^3}}{3}+C.$$

50/ Lopital qaydasına görə limiti hesab.

$\lim\limits_{x\to+\infty} \frac{kx^2}{e^x}$ $\quad k=\overline{1,30}$ $\quad k=5$

$\lim\limits_{x\to+\infty} \frac{5x^2}{e^x} = \lim\limits_{x\to+\infty} \frac{10x}{e^x} = \left[\frac{\infty}{\infty}\right] =$

$= \lim\limits_{x\to+\infty} \frac{(5x^2)'}{(e^x)'} = \lim\limits_{x\to+\infty} \frac{10x}{e^x} = \left[\frac{\infty}{\infty}\right] =$

$= \lim\limits_{x\to+\infty} \frac{10}{e^x} = \frac{10}{\infty} = 0$

48/ $\int x\cos kx\,dx$ $\quad k=\overline{1,10}$ $\quad k=5$

$$\int x\cos 5x\,dx = \left[\begin{matrix} u=x & dv=\cos 5x\,dx \\ du=dx & v=\frac{1}{5}\sin 5x \end{matrix}\right] =$$

$$= \frac{1}{5}x\sin 5x - \frac{1}{5}\int \sin 5x\,dx = \frac{1}{5}x\sin 5x +$$

$$+ \frac{1}{25}\cos 5x + C$$

49/ $y = 4x^3 - kx^2 + 5$ $\quad k=\overline{1,30}$ $\quad k=5$

$y = 4x^3 - 5x^2 + 5$

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$24x - 10 < 0$

$24x < 10$

$x < \frac{10}{24} \Rightarrow x < \frac{5}{12}$

$(-\infty; \frac{5}{12})$ interval qabarıq liq intervaldır.

21/ Ardıcıllığın limitini hesablayın. $x=\overline{1,30}$ $x=5$.

$$\lim_{n\to\infty}\frac{xn^2-3n+2}{1-2n+5n^2}=\lim_{n\to\infty}\frac{5n^2-3n+2}{1-2n+5n^2}=\lim_{n\to\infty}\frac{5-\frac{3}{n}\to 0+\frac{2}{n^2}\to 0}{\frac{1}{n^2}\to 0-\frac{2}{n}\to 0+5}=$$

$$=\frac{5}{5}=1.$$

22/ Funksiyanın təyin oblastını tapın. $x=\overline{1,30}$, $x=5$

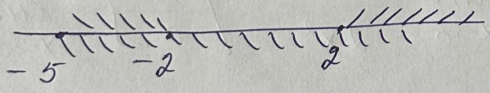
$$f(x)=\sqrt{x^2-4}+\sqrt{x+x}=\sqrt{x^2-4}+\sqrt{5+x}$$

$x^2-4\geq 0$ | $5+x\geq 0$

$(x-2)(x+2)\geq 0$. | $x\geq -5$

$x=2$ $x=-2$. | $[-5;\infty)$

$(-\infty;-2]\cup[2;\infty$



$D(f)=[-5;-2]\cup[2;\infty)$

23/ Funksiyanın limitini hesablayın. $x=\overline{1,30}$ $x=5$.

$$\lim_{x\to 0}\frac{1-\cos 2x}{x\cdot\sin x}=\lim_{x\to 0}\frac{1-\cos 2x}{5x\cdot\sin x}=\lim_{x\to 0}\frac{2\sin^2 x}{5x\cdot\sin x}=$$

$$=\frac{2}{5}\lim_{x\to 0}\frac{\sin x}{x}=\frac{2}{5}\cdot 1=\frac{2}{5}$$