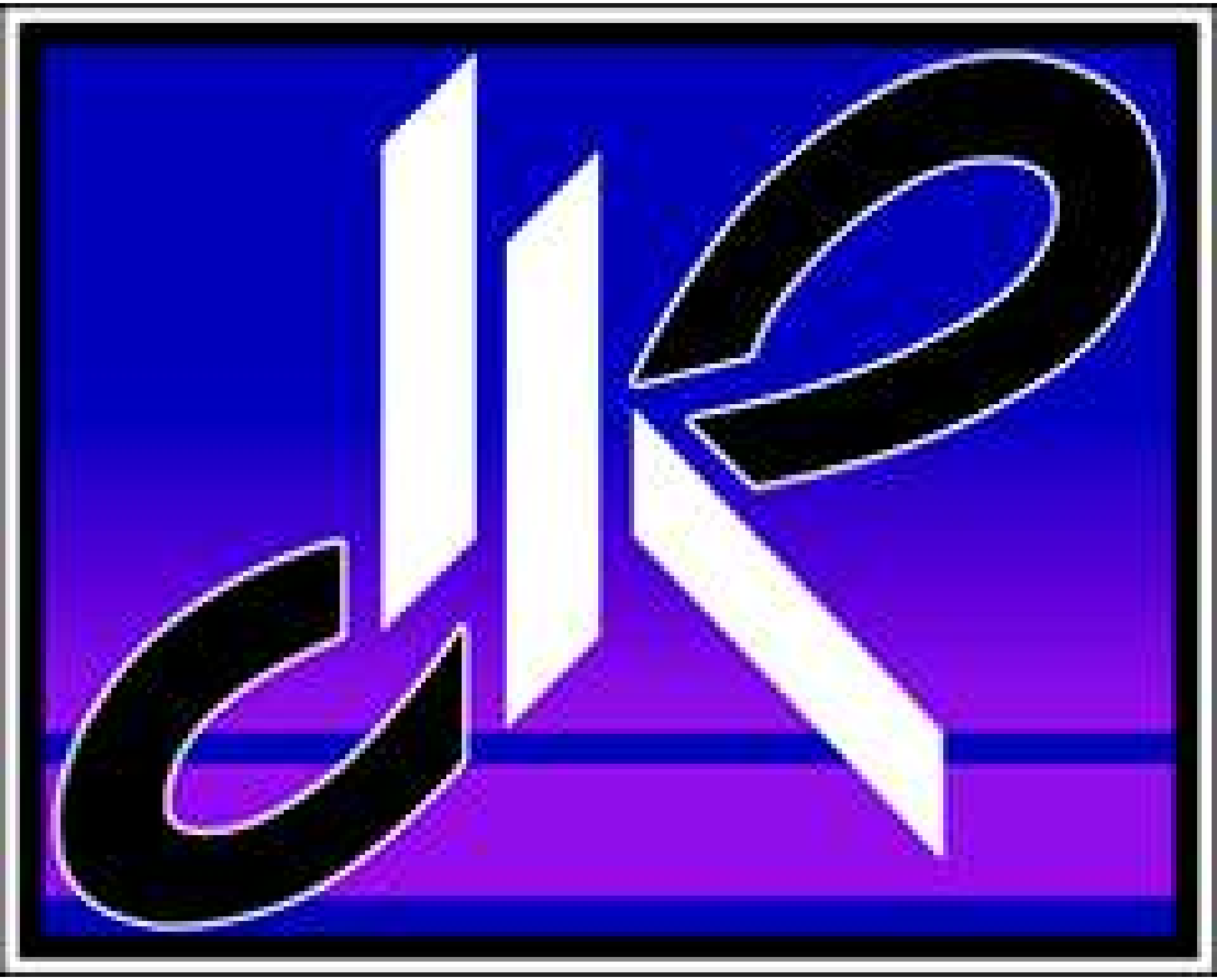

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.11.21)

$\int_0^9 \sqrt[3]{x\sqrt{x}}dx$ ni hisoblang.

Yechish.

$\sqrt[3]{x\sqrt{x}}=x^{\frac{1}{3}}\times x^{\frac{1}{6}}=x^{\frac{2+1}{6}=\frac{3}{6}}=x^{\frac{1}{2}}.$

$0=t.$

$$\lim_{t\to 0}\int_t^9 \sqrt{x}dx=\lim_{t\to 0}\left.\frac{x^{\frac{1}{2}+1}}{\frac{1}{2}+1}\right|_t^9 \longrightarrow \lim_{t\to 0}\left(\frac{9^{\frac{1+2}{2}}}{\frac{1+2}{2}}-\frac{t^{\frac{1+2}{2}}}{\frac{1+2}{2}}\right).$$

$$\lim_{t\to 0}\left(\frac{\sqrt{9^3}}{\frac{3}{2}}-\frac{\sqrt{t^3}}{\frac{3}{2}}\right)=\lim_{t\to 0}\left(\frac{2\sqrt{3^6}}{3}-\frac{2\sqrt{t^3}}{3}\right)=\lim_{t\to 0}\left(\frac{2\times 27-2\sqrt{t^3}}{3}\right).$$

$$\frac{2}{3}\lim_{t\to 0}\left(27-\sqrt{t^3}\right)=\frac{2\times 27-2\sqrt{0^3}}{3}=2\times 9=18.$$ Javob; 18.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2001.11.42)

Hisoblang.

$$\int_{\frac{\pi}{6}}^{\frac{5\pi}{6}} |\cos x| dx.$$

Yechish.

$$\left[\frac{\pi}{2};\frac{5\pi}{6}\right]\cup\left[\frac{\pi}{6};\frac{\pi}{2}\right].$$

$$\int_{\frac{\pi}{2}}^{\frac{5\pi}{6}} -\cos x dx+\int_{\frac{\pi}{6}}^{\frac{\pi}{2}} \cos x dx.$$

$$-\sin x\Big|_{\frac{\pi}{2}=90^\circ}^{\frac{5\pi}{6}=150^\circ} \longrightarrow -\sin 150^\circ+\sin 90^\circ.$$

$$-\sin(180^\circ-30^\circ)+1=-\sin 30^\circ+1=-\frac{1}{2}+1=\frac{1}{2}.$$

$$\sin x\Big|_{\frac{\pi}{6}=30^\circ}^{\frac{\pi}{2}=90^\circ} \longrightarrow \sin 90^\circ-\sin 30^\circ=1-\frac{1}{2}=\frac{1}{2}.$$

$$\frac{1}{2}+\frac{1}{2}=\frac{2}{2}=1.$$ Javob; 1.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2001.10.50)

α ning qanday eng katta manfiy butun qiymatida

$$\int_{\alpha}^{0}(3^{-2x}-2\times 3^{-x})dx\geqslant 0.$$

Yechish.

$$\int\frac{1}{3^{2x}}-2\int\frac{1}{3^{x}}.$$

$\alpha=-1$

$$-\frac{1}{2\ln(3)3^{2x}}\Bigg|_{-1}^{0}\ \to\ -\frac{1}{2\ln(3)\frac{1}{9}}+\frac{1}{2\ln(3)}=\frac{-9+1}{2\ln(3)}=\frac{4}{\ln(3)}.$$

$$-\left(-\frac{2}{\ln(3)3^{x}}\right)\Bigg|_{-1}^{0}\ \to\ -\left(-\frac{2}{\ln(3)}+\frac{6}{\ln(3)}\right)=-\left(\frac{-2+6}{\ln(3)}\right)=-\frac{4}{\ln(3)}.$$

$\frac{4}{\ln(3)}-\frac{4}{\ln(3)}\geqslant 0\ \ 0=0.$ Javob; -1.

21.11.1993 MATEMATIKA
ANTARES VY TM*
Ω
ABDULAZIZ
RAHIMOV +998972774773

(1999.2.44)

Hisoblang.

$$\int_{\frac{5\pi}{3}}^{\frac{4\pi}{3}} |\sin x| dx.$$

Yechish.

$\frac{4\pi}{3}=240^\circ$. $\frac{5\pi}{3}=300^\circ$.

$|\sin x|=240^\circ \Rightarrow 300^\circ$ $-$.

$$\int_{300^\circ}^{240^\circ} -\sin x dx = \cos x \Big|_{300^\circ}^{240^\circ} \longrightarrow .$$

$$-\cos 240^\circ - \cos 300^\circ = -\cos(270^\circ - 30^\circ) - \cos(360^\circ - 60^\circ).$$

$$-\sin 30^\circ - \cos 60^\circ = -\frac{1}{2} - \frac{1}{2} = -1.$$ Javob; -1.

21.11.1993

ANTARES VY MATEMATIKA

ABDULAZIZ
RAHIMOV
+998972774773

(2003.1.52)

$\int_1^2 \frac{x}{x+1} dx$ ni hisoblang.

Yechish.

$x+1-\ln(|x+1|)\Big|_1^2 \longrightarrow .$

$2+1-1-1-\ln(|2+1|)+\ln(|1+1|).$

$1+\ln\frac{2}{3}.$ Javob; $1+\ln\frac{2}{3}.$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2003.7.33)

$\int_0^1 \sqrt{x\sqrt[3]{x\sqrt[4]{x}}}dx$ ni hisoblang.

Yechish.

$\sqrt{x\sqrt[3]{x\sqrt[4]{x}}}=x^{\frac{1}{2}}\times x^{\frac{1}{6}}\times x^{\frac{1}{24}}=x^{\frac{1}{2}+\frac{1}{6}+\frac{1}{24}}=x^{\frac{12+4+1}{12}=\frac{17}{12}}=x^{\frac{17}{24}}.$

$0=t.$

$$\lim_{t\to 0}\int_t^1 \sqrt[24]{x^{17}}dx=\lim_{t\to 0}\left(\frac{x^{\frac{17}{24}+1}}{\frac{17}{24}+1}\right)\Bigg|_t^1 \longrightarrow.$$

$$\lim_{t\to 0}\left(\frac{1^{\frac{17+24}{24}}}{\frac{17+24}{24}}-\frac{t^{\frac{17+24}{24}}}{\frac{17+24}{24}}\right)=\lim_{t\to 0}\left(\frac{1}{\frac{41}{24}}-\frac{\sqrt[24]{t^{41}}}{\frac{41}{24}}\right)=\lim_{t\to 0}\left(\frac{24}{41}-\frac{24\sqrt[24]{t^{41}}}{41}\right).$$

$$\lim_{t\to 0}\left(\frac{24-24\sqrt[24]{t^{41}}}{41}\right)=\frac{1}{41}\lim_{t\to 0}\left(24-24\sqrt[24]{t^{41}}\right)=\frac{24-24\sqrt[24]{0^{41}}}{41}=\frac{24}{41}.$$ Javob; $\frac{24}{41}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.9.2)

Hisoblang.

$$\int_0^2 |x^2-1|dx.$$

Yechish.

$[0;1]\cup[1;2]$.

$$\int_0^1 (1-x^2)dx+\int_1^2 (x^2-1)dx.$$

$$x-\frac{x^3}{3}\Big|_0^1 \longrightarrow 1-0-\frac{1}{3}+0=\frac{2}{3}.$$

$$\frac{x^3}{3}-x\Big|_1^2 \longrightarrow \frac{8}{3}-\frac{1}{3}-2+1=\frac{8-1-3}{3}=\frac{4}{3}.$$

$$\frac{2}{3}+\frac{4}{3}=\frac{6}{2}=2.$$ Javob; 2.

21.11.1993 MATEMATIKA
ANTARES VY TM★ Ω
ABDULAZIZ
RAHIMOV +998972774773

(1997.3.31)

Hisoblang.

$$\int_0^1 (3x-1)^2 dx.$$

(Yechish).

$$\int 9x^2-6x+1dx.$$

$$9\int x^2dx-6\int xdx+\int 1dx.$$

$$3x^3-3x+x\Big|_0^1 \quad \longrightarrow \quad 3-3+1-0=1.$$ Javob; 1.

21.11.1993 MATEMATIKA
ANTARES VY TM
ABDULAZIZ
RAHIMOV +998972774773

(1997.2.49)

Hisoblang.

$$\int_0^{\frac{\pi}{4}} (1+\mathrm{tg}^2 x)\,dx.$$

(Yechish).

$$\int_0^{\frac{\pi}{4}} 1\,dx + \int_0^{\frac{\pi}{4}} (\sec^2 x - 1)\,dx.$$

$$x + \int \frac{1}{\cos^2 x} - \int 1\,dx. \Rightarrow x + \mathrm{tg}x - x.$$

$$\mathrm{tg}x\Big|_0^{\frac{\pi}{4}} \longrightarrow \mathrm{tg}\frac{\pi}{4} - \mathrm{tg}0 = 1.$$ Javob; 1.

21.11.1993

ANTARES VY MATEMATIKA

ABDULAZIZ
RAHIMOV
+9998972774773

(2002.12.56)

$$\int_{\frac{\pi}{6}}^{\frac{\pi}{4}}(1+\mathrm{ctg}^2 x)\,dx.$$

Yechish.

$$1+\mathrm{ctg}^2 x=\frac{1}{\sin^2 x}.$$

$$\int\frac{1}{\sin^2 x}=-\mathrm{ctg}x.$$

$$-\mathrm{ctg}\Big|_{\frac{\pi}{6}=30^\circ}^{\frac{\pi}{4}=45^\circ} \longrightarrow -\mathrm{ctg}45^\circ+\mathrm{ctg}30^\circ.$$

$-1+\sqrt{3}=\sqrt{3}-1$. Javob; $\sqrt{3}-1$.

21.11.1993 MATEMATIKA
ANTARES VY TM*
Ω
ABDULAZIZ
RAHIMOV +998972774773

(1998.4.43)

α ning qanday qiymatlarida

$$\int_0^2 (t-\log_2\alpha)dt=2\log_2\frac{2}{\alpha}$$

tenglik o'rinli bo'ladi?

(Yechish).

$\alpha>0$. $\alpha=1$.

$$\int(t-\log_2 1)dt=\int tdt=\frac{1}{2}t^2=2\log_2 2.$$

$$\frac{1}{2}t^2\Big|_0^2 \longrightarrow \frac{1}{2}\times 4=2.$$

$\alpha=(1,2,4,8,....) \Rightarrow \alpha\in(0;+\infty)$. Javob; $\alpha\in(0;+\infty)$.

21.11.1993 MATEMATIKA

ANTARES VY TM★ Ω

ABDULAZIZ
RAHIMOV +998972774773

(1996.6.49)

Integralni hisoblang.

$$\int_0^{e^2-1} \frac{dx}{x+1}.$$

(Yechish).

$$\int_0^{e^2-1} \frac{1}{x+1}dx.$$

$$\ln(x+1)\Big|_0^{e^2-1} \longrightarrow \ln(e^2-1+1)-\ln(0+1).$$

$\ln e^2-\ln 1=2\ln e-0=2$. Javob; 2.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.4.20)

Integralni hisoblang.

$$\int_{-1}^{0}|5^{x}-5^{-x}|dx$$

Yechish.

$$\int(5^{-x}-5^{x})dx$$

$$-\frac{5^{x}}{\ln 5}\Big|_{-1}^{0} \longrightarrow -\frac{5^{0}}{\ln 5}+\frac{5^{-1}}{\ln 5}=\frac{1}{5\ln 5}-\frac{1}{\ln 5}=-\frac{4}{5\ln 5}.$$

$$-\frac{1}{5^{x}\ln 5}\Big|_{-1}^{0} \longrightarrow -\frac{1}{\ln 5}+\frac{5}{\ln 5}=\frac{-1+5}{\ln 5}=\frac{4}{\ln 5}.$$

$$\frac{4}{\ln 5}-\frac{4}{5\ln 5}=\frac{20-4}{5\ln 5}=\frac{16}{5\ln 5}.$$ Javob; $\frac{16}{5\ln 5}$.

21.11.1993 MATEMATIKA
ANTARES VY TM*
ABDULAZIZ
RAHIMOV +998972774773

(1998.1.32)

Integralni Hisoblang.

$$\int_0^{2\pi} |\sin x| dx.$$

Yechish.

$[0;\pi] \cup [\pi;2\pi]$.

$$\int_0^{\pi} \sin x dx - \int_{\pi}^{2\pi} \sin x dx.$$

$$-\cos x\Big|_0^{\pi} \longrightarrow -\cos x\pi + \cos 0.$$

$$\cos x\Big|_{\pi}^{2\pi} \longrightarrow -\cos 2\pi - \cos\pi.$$

$-\cos\pi + \cos 0 + \cos 2\pi - \cos\pi = 1+1+1+1 = 4$. Javob; 4.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2002.11.55)

$\int_1^9 \left(3\sqrt{x}+\frac{1}{\sqrt{x}}\right)dx$ ni hisoblang.

Yechish.

$\int 3\sqrt{x}dx+\int \frac{1}{\sqrt{x}}.$

$2x\sqrt{x}\Big|_1^9 \longrightarrow 18\sqrt{9}-2=54-2=52.$

$\sqrt{x}\Big|_1^9 \longrightarrow 2\sqrt{9}-2=6-2=4.$

$52+4=56.$ Javob; 56.

21.11.1993 MATEMATIKA

ANTARES VY TM* Ω

ABDULAZIZ

RAHIMOV +998972774773

(1998.12.40)

Hisoblang.

$$\int_0^2 (|x|+1)dx.$$

Yechish.

$$\frac{1}{2}\int x dx + \int dx.$$

$$\frac{1}{2}x^2+x\Big|_0^2 \longrightarrow 2+2-0=4.$$

Javob; 4.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2000.5.50)

Hisoblang.

$$\int_0^6 |x-3|dx$$

Yechish.

$[0;3]\cup[3;6]$.

$$-\int_0^3 (x-3)dx+\int_3^6 (x-3)dx.$$

$$3x-\frac{x^2}{2}\Big|_0^3 \longrightarrow 9-\frac{9}{2}-0=\frac{9}{2}=4{,}5.$$

$$\frac{x^2}{2}-3x\Big|_3^6 \longrightarrow \frac{36}{2}-18-\frac{9}{2}+9=\frac{27}{2}-9=\frac{27-18}{2}=\frac{9}{2}=4{,}5.$$

$4{,}5+4{,}5=9$. Javob; 9.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2003.3.55)

$\int_4^9 \left(\frac{2x}{5}-\frac{1}{2\sqrt{x}}\right)dx$ ni hisoblang.

Yechish.

$$\frac{2}{5}\int x dx-\frac{1}{2}\int\frac{1}{\sqrt{x}}=\frac{x^2}{5}-\sqrt{x}.$$

$$\frac{x^2}{5}\Big|_4^9 \longrightarrow \frac{81}{5}-\frac{16}{5}=\frac{65}{5}=13.$$

$$\sqrt{x}\Big|_4^9 \longrightarrow \sqrt{9}-\sqrt{4}=3-2=1.$$

$13-1=12$. Javob; 12.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.12.28)

$\int_0^4 \frac{dx}{0,5x+1}$ ni hisoblang.

Yechish.

$$\frac{1}{0,5x+1}=\frac{1}{\frac{x}{2}+1}=\frac{1}{\frac{x+2}{2}}=\frac{2}{x+2}.$$

$$2\int\frac{1}{x+2}dx=2\ln(|x+2|).$$

$$2\ln(|x+2|)\Big|_0^4 \longrightarrow 2\ln(|4+2|)-2\ln(|0+2|).$$

$$2\ln\frac{6}{2}=2\ln 3=\ln 3^2=\ln 9.$$ Javob; $\ln 9$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2002.2.33)

$\int_0^{\frac{\pi}{4}} 6\cos 3x\,dx$ ni hisoblang.

Yechish.

$6\int \cos 3x\,dx = 2\sin 3x.$

$2\sin 3x\Big|_0^{\frac{\pi}{4}=45^\circ} \longrightarrow 2\sin 3\times 45^\circ - 2\sin 0.$

$2\sin(180^\circ - 45^\circ) = 2\sin 45^\circ = \frac{2\sqrt{2}}{2} = \sqrt{2}.$ Javob; $\sqrt{2}$.

21.11.1993 MATEMATIKA

ANTARES VY$_{\Omega}^{TM\star}$

ABDULAZIZ
RAHIMOV +998972774773

(1996.9.82).

Hisoblang.

$$\int_0^{\frac{\pi}{4}} \sin 2x dx.$$

(Yechish).

$2x=t.$

$$\int_0^{\frac{\pi}{4}} \frac{\sin(t)}{2} dt. \Rightarrow \frac{1}{2}\int_0^{\frac{\pi}{4}} \sin(t) dt.$$

$$-\frac{\cos 2x}{2}\Big|_0^{\frac{\pi}{4}} \longrightarrow -\frac{\cos 2\times\frac{\pi}{4}}{2}+\frac{\cos 0}{2}.$$

$0+\frac{1}{2}=\frac{1}{2}.$ Javob; $\frac{1}{2}$.

21.11.1993 MATEMATIKA
ANTARES VY TM*
ABDULAZIZ
RAHIMOV +998972774773

(2000.1.45)

To'g'ri chiziq bo'ylab harakatlanayotgan moddiy nuqtaning tezligi $V(t)=3t^2-2t+2$ (m/s) tenglama bilan ifodalanadi. Harakat boshlangandan 3 sek. o'tgunga qadar bu nuqta qancha masofani (m) ni bosib o'tadi?

(Yechish).

$\int 3t^2-2t+2dx=3\int t^2dx-2\int tdx+\int 2dt.$

$t^3-t^2+2t=S(t).$

$S(3)=27-9+6=24.$ Javob; 24.

21.11.1993 MATEMATIKA

ANTARES VY TM* Ω

ABDULAZIZ

RAHIMOV +998972774773

(1996.10.33).

Integralni hisoblang.

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \cos 2x dx.$$

(Yechish).

$2x=t.$

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{\cos(t)}{2} dt. \quad \frac{1}{2}\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \cos(t) dt.$$

$$\frac{\sin 2x}{2}\Big|_{\frac{\pi}{3}}^{\frac{\pi}{2}} \longrightarrow \frac{\sin 2\times\frac{\pi}{2}}{2} - \frac{\sin 2\times\frac{\pi}{3}}{2}.$$

$$\frac{\sin\pi - \sin\frac{2\pi}{3}}{2} = \frac{0-\frac{\sqrt{3}}{2}}{2} = -\frac{\sqrt{3}}{4}. \quad \text{Javob; } -\frac{\sqrt{3}}{4}.$$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.6.25)

$\int_0^1 \sqrt{x\sqrt{x\sqrt{x}}}dx$ ni hisoblang.

Yechish.

$\sqrt{x\sqrt{x\sqrt{x}}}=x^{\frac{1}{2}}\times x^{\frac{1}{4}}\times x^{\frac{1}{8}}=x^{\frac{4+2+1}{8}}=x^{\frac{7}{8}}.$

$0=t.$

$$\lim_{t\to 0}\int_t^1 x^{\frac{7}{8}}dx=\frac{x^{\frac{7}{8}+1}}{\frac{7}{8}+1}\Bigg|_t^1 \longrightarrow$$

$$\lim_{t\to 0}\left(\frac{1^{\frac{7+8}{8}}}{\frac{7+8}{8}}-\frac{t^{\frac{7+8}{8}}}{\frac{7+8}{8}}\right)=\lim_{t\to 0}\left(\frac{1^{\frac{15}{8}}}{\frac{15}{8}}-\frac{t^{\frac{15}{8}}}{\frac{15}{8}}\right)=\lim_{t\to 0}\left(\frac{8}{15}-\frac{8\sqrt[8]{t^{15}}}{15}\right).$$

$$\lim_{t\to 0}\left(\frac{8-8\sqrt[8]{t^{15}}}{15}\right)=\frac{1}{15}\lim_{t\to 0}\left(8-8\sqrt[8]{t^{15}}\right)=\frac{\left(8-8\sqrt[8]{0^{15}}\right)}{15}=\frac{8}{15}.$$ Javob; $\frac{8}{15}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.2.29)

Hisoblang.

$$\int_0^{2\pi} \cos 2x \cos 7x dx.$$

Yechish.

$$\cos 2x \cos 7x = \frac{1}{2}(\cos(7x-2x)+\cos(7x+2x)).$$

$$\frac{1}{2}\int \cos 5x dx + \frac{1}{2}\int \cos 9x dx.$$

$$\frac{\sin 5x}{10} + \frac{\sin 9x}{18}\Big|_0^{2\pi} \longrightarrow \frac{\sin 10\pi}{10} - 0 + \frac{\sin 18\pi}{18} - 0 = 0.$$

Javob; 0.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.1.53)

$\int_3^4 \frac{dx}{x^2-1}$ ni hisoblang.

Yechish.

$$\frac{1}{2}\ln\left(\left|\frac{x-1}{x+1}\right|\right)\Big|_3^4 \to \frac{1}{2}\ln\left(\left|\frac{4-1}{4+1}\right|\right)-\frac{1}{2}\ln\left(\left|\frac{3-1}{3+1}\right|\right).$$

$$\frac{1}{2}\ln\frac{3}{5}-\frac{1}{2}\ln\frac{1}{2}=\frac{1}{2}\ln\frac{\frac{3}{5}}{\frac{1}{2}}=\ln\left(\frac{6}{5}\right)^{\frac{1}{2}}.$$

$\ln\sqrt{\frac{6}{5}}$. Javob; $\ln\sqrt{\frac{6}{5}}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2003.9.49)

$\int_4^9 \left(\frac{2x}{5}+\frac{1}{2\sqrt{x}}\right)dx$ ni hidoblang.

Yechish.

$$\frac{2}{5}\int x dx+\frac{1}{2}\int\frac{1}{\sqrt{x}}=\frac{x^2}{5}+\sqrt{x}.$$

$$\frac{x^2}{5}\Big|_4^9 \longrightarrow \frac{81}{5}-\frac{16}{5}=\frac{65}{5}=13.$$

$$\sqrt{x}\Big|_4^9 \longrightarrow \sqrt{9}-\sqrt{4}=3-2=1.$$

$13+1=14$. Javob; 14.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.9.11)

Integralni hisoblang.

$$\int_0^{\frac{\pi}{18}} (\cos x \cos 2x - \sin x \sin 2x)\,dx.$$

Yechish.

$$\cos 2x \cos x = \frac{1}{2}(\cos(2x-x)+\cos(2x+x)).$$

$$\frac{\cos 3x}{2}+\frac{\cos x}{2}.$$

$$\sin 2x \sin x = \frac{1}{2}(\cos(2x-x)-\cos(2x+x)).$$

$$\frac{\cos x}{2}-\frac{\cos 3x}{2}.$$

$$\int\left(\frac{\cos 3x}{2}+\frac{\cos x}{2}+\frac{\cos 3x}{2}-\frac{\cos x}{2}\right)dx=\int \cos 3x\,dx.$$

$$\frac{1}{3}\sin 3x\Big|_0^{\frac{\pi}{18}} \longrightarrow \frac{\sin 3\times\frac{\pi}{18}}{3}-\frac{\sin 0}{3}.$$

$$\frac{\sin 30^\circ}{3}=\frac{\frac{1}{2}}{3}=\frac{1}{6}.$$ Javob; $\frac{1}{6}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2002.7.38)

$\int_0^{\frac{\pi}{2}}(\cos x-\sin x)^2dx$ ni hisoblang.

Yechish.

$(\cos x-\sin x)^2=\cos^2 x-2\cos x\sin x+\sin^2 x.$

$1-\sin 2x.$

$\int dx-\int \sin 2x=x+\frac{1}{2}\cos 2x.$

$x+\frac{1}{2}\cos 2x\Big|_0^{\frac{\pi}{2}=90^\circ}$ —> $\frac{\pi}{2}-0+\frac{1}{2}\cos 180^\circ-\frac{1}{2}\cos 0.$

$\frac{\pi}{2}-\frac{1}{2}-\frac{1}{2}=\frac{\pi-1-1}{2}=\frac{\pi-2}{2}=\frac{\pi}{2}-1.$ Javob; $\frac{\pi}{2}-1.$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.4.54).

Hisoblang.

$$\frac{1}{16}\int_0^{\pi}\frac{dx}{\cos^2\left(\frac{x}{4}\right)}.$$

Yechish.

$$\frac{1}{16}\times 4\,tg\left(\frac{x}{4}\right)\Bigg|_0^{\pi} \longrightarrow \frac{tg\frac{\pi}{4}}{4}-0=\frac{1}{4}=0{,}25.$$ Javob; 0,25.

21.11.1993 MATEMATIKA
TM*
VY
ANTARES Ω
ABDULAZIZ
RAHIMOV +998972774773

(1999.1.27)

Hisoblang.

$$\int_0^2 x^3 dx.$$

Yechish.

$$\frac{1}{4}\int x^3 dx = \frac{x^4}{4}\Big|_0^2 \longrightarrow \frac{16}{4} - 0 = 4.$$ Javob; 4.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2000.2.44)

b ning qanday qiymatida

$$\int_{-1}^{1}(4x+b)dx$$

integralning qiymati 1 ga teng bo'ladi?

Yechish.

$$4\int xdx+\int bdx.$$

$$2x^2+bx\Big|_{-1}^{1} \longrightarrow 2-2+b+b=1.$$

$$2b=1. \Rightarrow b=\frac{1}{2}. \quad \text{Javob; } \frac{1}{2}.$$

(1997.1.62)

Hisoblang.

$$\int_{-1}^{2}|2-x|dx.$$

Yechish.

$[-1;0]\cup[0;2]$ +.

$$\int_{-1}^{2}(2-x)dx=\int 2dx-\frac{1}{2}\int xdx.$$

$$2x-\frac{x^2}{2}\Big|_{-1}^{2} \longrightarrow 4-\frac{4}{2}-\left(-2-\frac{1}{2}\right).$$

$$2+\frac{5}{2}=\frac{9}{4}=4{,}5.$$ Javob; 4,5.

21.11.1993 MATEMATIKA

ANTARES VY$^{TM\star}_{\Omega}$

ABDULAZIZ
RAHIMOV +998972774773

(1997.12.48).

Integralni hisoblang.

$$\int_{e}^{2e}\frac{1}{2x-e}dx.$$

(Yechish).

$2x-e=t.$

$$\int_{e}^{2e}\frac{1}{2t}dt. \Rightarrow \frac{1}{2}\int_{e}^{2e}\frac{1}{t}dt.$$

$$\frac{1}{2}\ln|2x-e|\Big|_{e}^{2e} \quad -> \ldots$$

$$\frac{1}{2}\ln|4e-e|-\frac{1}{2}\ln|2e-e|=\frac{1}{2}\ln|3e|-\frac{1}{2}\ln|e|.$$

$$\frac{1}{2}(\ln(3)+\ln(e))-\frac{1}{2}=\frac{1}{2}\ln 3+\frac{1}{2}-\frac{1}{2}.$$

$$\frac{1}{2}\ln 3=\ln 3^{\frac{1}{2}}=\ln\sqrt{3}. \quad \text{Javob; } \ln\sqrt{3}.$$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.7.40)

Hisoblang.

$$\int_{\frac{1}{2}}^{2}|x-1|dx$$

Yechish.

$$\left[\frac{1}{2};1\right]\cup[1;2].$$

$$\int_{\frac{1}{2}}^{1}(1-x)dx+\int_{1}^{2}(x-1)dx.$$

$$x-\frac{x^2}{2}\Big|_{\frac{1}{2}}^{1} \longrightarrow 1-\frac{1}{2}-\left(\frac{1}{2}-\frac{1}{8}\right)=\frac{1}{2}-\frac{3}{8}=\frac{1}{8}.$$

$$\frac{x^2}{2}-x\Big|_{1}^{2} \longrightarrow 2-\frac{1}{2}-(2-1)=\frac{3}{2}-1=\frac{1}{2}.$$

$$\frac{1}{2}+\frac{1}{8}=\frac{4+1}{8}=\frac{5}{8}.$$ Javob; $\frac{5}{8}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2000.6.29)

a va b ning qanday qiymatlarida

$\phi(x)=a\cos\frac{\pi x}{2}+b$ funksiya uchun

$\phi'(1)=1,5$ $\int_0^2\phi(x)dx=3$ tengliklar

o'rinli bo'ladi?

Yechish.

Javob; $a=-\frac{3}{\pi}$. $b=1,5$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

$$\int_1^{\infty} \frac{x+2}{x^2+2x+2}.$$

$\infty = t.\ \ x^2+1x+2=(x+1)^2+1.$

$x+2=x+1+1.\ \ x+1=u.$

$du=1dx.$

$$\lim_{t\to\infty} \int_2^{t+1} \frac{u+1}{u^2+1}du = \lim_{t\to\infty} \int_2^{t+1} \frac{u}{u^2+1}du + \int_2^{t+1} \frac{1}{u^2+1}du.$$

$$\frac{\ln\frac{t^2+2t+2}{5}}{2} + \operatorname{arctg}(u)\Big|_2^{t+1} \quad -> .$$

$$\operatorname{arctg}(t+1) - \operatorname{arctg}(2) + \frac{\ln\frac{t^2+2t+2}{5}}{2}.$$

$$\lim_{t\to\infty} \frac{\ln\frac{t^2+2t+2}{5} + 2\operatorname{arctg}(t+1) - 2\operatorname{arctg}(2)}{2}$$

$$\frac{1}{2}\lim_{t\to\infty}\left(\ln\frac{t^2+2t+2}{5} + 2\operatorname{arctg}(t+1) - 2\operatorname{arctg}(2)\right).$$

$$\frac{1}{2}\lim_{t\to\infty} \ln\frac{t^2+2t+2}{5} + \frac{1}{2}\lim_{t+\infty}(2\operatorname{arctg}(t+1) - 2\operatorname{arctg}(2)).$$

$$\frac{\ln\frac{\infty^2+\infty+2}{5}}{2} + (2\operatorname{arctg}(\infty+1) - 2\operatorname{arctg}(2)).$$

$$\frac{\ln\frac{\infty}{5}}{2} + \left(\frac{2\pi}{2} - 2\operatorname{arctg}(2)\right) = \frac{\infty}{2} + \pi - 2\operatorname{arctg}(2) = \infty. \quad \text{Javob; } \infty.$$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.9.42)

Hisoblang.

$$\int_0^{2\pi} \sin^4 7x dx.$$

Yechish.

$$\sin^4 7x = \frac{(1+\cos 14x)^2}{4} = \frac{1+2\cos 14x+\frac{1+\cos 28x}{2}}{4}.$$

$$\frac{2+4\cos 14x+1+\cos 28x}{8} = \frac{3}{8}+\frac{\cos 14x}{2}+\frac{\cos 28x}{8}.$$

$$\frac{3}{8}\int dx+\frac{1}{2}\int \cos 14x dx+\frac{1}{8}\int \cos 28x dx.$$

$$\frac{3}{8}dx+\frac{\sin 14x}{28}+\frac{\sin 28}{224}\Big|_0^{2\pi} \longrightarrow \ldots.$$

$$\frac{3\pi}{4}-0+\frac{\sin 28\pi}{28}-0+\frac{\sin 56\pi}{224}-0=\frac{3\pi}{4}.$$ Javob; $\frac{3\pi}{4}$.

21.11.1993 MATEMATIKA

ANTARES VY TM★ Ω

ABDULAZIZ
RAHIMOV +998972774773

(1997.6.63)

Hisoblang.

$$\int_{-2}^{3} |3-x|dx.$$

Yechish.

$$\int_{-2}^{3} 3-xdx = \int 3dx - \frac{1}{2}\int xdx.$$

$$3x - \frac{x^2}{2}\Big|_{-2}^{3} \longrightarrow 9 - \frac{9}{2} + 6 + 2 = \frac{25}{2} = 12{,}5.$$ Javob; 12,5.

21.11.1993 MATEMATIKA
ANTARES VY TM*
ABDULAZIZ
RAHIMOV +998972774773

(1997.11.22)

Integralni hisoblang.

$$\int_0^{\frac{\pi}{2}} \sin 5x dx.$$

(Yechish).

$5x=t.$

$$\int_0^{\frac{\pi}{2}} \frac{\sin(t)}{5} dt. \Rightarrow \frac{1}{5}\int_0^{\frac{\pi}{2}} \sin(t) dt.$$

$$-\frac{\cos 5x}{5}\Big|_0^{\frac{\pi}{2}} \Rightarrow -\frac{\cos 5\times\frac{\pi}{2}}{5}+\frac{\cos 0}{5}.$$

$$\frac{-\cos(360^\circ+90^\circ)-1}{5}=\frac{-\cos 90^\circ+1}{5}=\frac{1}{5}.$$

Javob; $\frac{1}{5}$.

21.11.1993 MATEMATIKA
ANTARES VY TM*
ABDULAZIZ
RAHIMOV +998972774773

(1996.7.31)

Hisoblang.

$$\int_0^2 (1-2x)^2 dx.$$

(Yechish).

$$\int_0^2 1-4x+4x^2 dx.$$

$$\int_0^2 1dx - \int_0^2 4xdx + \int_0^2 4x^2 dx.$$

$$x-4\int_0^2 xdx+4\int_0^2 x^2 dx. \Rightarrow$$

$$x-4\times\frac{x^2}{2}+4\times\frac{x^3}{3}\Big|_0^2 \longrightarrow$$

$$2-8+\frac{32}{3}-0=\frac{6-24+32}{3}=\frac{14}{3}=4\frac{2}{3}.$$ Javob; $4\frac{2}{3}$.

21.11.1993 MATEMATIKA
ANTARES VY TM★ Ω
ABDULAZIZ
RAHIMOV +998972774773

(1998.10.76)

Hisoblang.

$v(t)=t^2-t+1$ m/s tezlik bilan to'g'ri chiziq bilan harakatlanayotgan moddiy nuqta dastlabki 6 sek. vaqt oralig'ida qancha masofani bosib o'tadi?

(Yechish).

$$\int t^2-t+1dx=\frac{1}{3}\int t^2dx-\frac{1}{2}\int tdx+\int 1dx.$$

$$S(t)=\frac{1}{3}t^3-\frac{1}{2}t^2+t.$$

$S(6)=72-18+6=78-18=60.$ Javob; 60.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.10.48)

Hisoblang.

$$\int_{-\frac{\pi}{24}}^{\frac{\pi}{24}} \frac{dx}{(\cos^4 3x - \sin^4 3x)^2}.$$

Yechish.

$$\int \frac{1}{\left(\frac{\cos 12x + 4\cos 6x + 3}{8} - \frac{\cos 12x - 4\cos 6x + 3}{8}\right)^2} dx.$$

$$\int \frac{1}{\left(\frac{\cos 12x + 4\cos 6x + 3 - \cos 12x + 4\cos 6x - 3}{8}\right)^2} dx.$$

$$\int \frac{1}{\left(\frac{8\cos 6x}{8}\right)^2} dx = \int \frac{1}{\cos^2 6x} = \frac{1}{6} tg 6x.$$

$$\frac{1}{6} tg 6x \Big|_{-\frac{\pi}{24}}^{\frac{\pi}{24}} \longrightarrow \frac{1}{6} tg 6 \times \frac{\pi}{24} + \frac{1}{6} tg 6 \times \frac{\pi}{24}.$$

$$\frac{1}{6} tg \frac{\pi}{4} + \frac{1}{6} tg \frac{\pi}{4} = \frac{1+1}{6} = \frac{2}{6} = \frac{1}{3}.$$ Javob; $\frac{1}{3}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(1998.2.44)

Integralni hisoblang.

$$\int_0^{\frac{\pi}{6}} \sin 2x\,dx.$$

Yechish.

$$\int \sin 2x\,dx = -\frac{1}{2}\cos 2x.$$

$$-\frac{1}{2}\cos 2x\Big|_0^{\frac{\pi}{6}=30^\circ} \longrightarrow -\frac{1}{2}\cos 2\times 30^\circ + \frac{1}{2}\cos 0.$$

$$-\frac{1}{2}\cos 60^\circ + \frac{1}{2} = -\frac{1}{4} + \frac{1}{2} = \frac{-1+2}{4} = \frac{1}{4}.$$ Javob; $\frac{1}{4}$.

21.11.1993 MATEMATIKA
ANTARES VY TM*
Ω
ABDULAZIZ
RAHIMOV +998972774773

(1998.9.42)

Hisoblang.

$$\int_{\frac{\pi}{12}}^{\frac{\pi}{4}} \frac{dx}{\sin^2 2x}.$$

(Yechish).

$2x=t.$

$$\frac{1}{2}\int \frac{1}{\sin^2(t)}dt.$$

$$-\frac{1}{2}ctg2x\Big|_{\frac{\pi}{12}}^{\frac{\pi}{4}} \longrightarrow -\frac{1}{2}ctg\frac{\pi}{2}+\frac{1}{2}ctg\frac{\pi}{6}.$$

$0+\frac{1}{2}\sqrt{3}=\frac{\sqrt{3}}{2}.$ Javob; $\frac{\sqrt{3}}{2}.$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(2002.3.81)

$\int_{-1}^{3} \frac{1}{\sqrt{2x+3}} dx$ ni hisoblang.

Yechish.

$\sqrt{2x+3}\Big|_{-1}^{3} \longrightarrow \sqrt{6+3}-\sqrt{-2+3}=\sqrt{9}-\sqrt{1}.$

$3-1=2.$ Javob; 2.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.7.52)

Hisoblang.

$$\int_0^{\frac{\pi}{2}} \sin x \cos x dx.$$

Yechish.

$$\sin x \cos x = \frac{1}{2}(\sin(x+x)+\sin(x-x)).$$

$$\frac{1}{2}\sin 2x \Rightarrow \frac{1}{2}\int \sin 2x = -\frac{1}{4}\cos 2x.$$

$$-\frac{1}{4}\cos 2x\Big|_0^{\frac{\pi}{2}} \longrightarrow -\frac{1}{4}\cos 2\times\frac{\pi}{2}+\frac{1}{4}\cos 0.$$

$\frac{1}{4}+\frac{1}{4}=\frac{1}{2}$. Javob; $\frac{1}{2}$.

(1998.11.106).

Tengsizlikni qanoatlantiruvchi sonlar nechita?

$$\int_1^{\alpha}(\alpha-4x)dx\geqslant 6-5\alpha \quad (\alpha>1).$$

Yechish.

$$\int \alpha dx-4\int x dx=\alpha x-2x^2\Big|_1^{\alpha} \longrightarrow$$

$$\alpha^2-2\alpha^2-\alpha+2\geqslant 6-5\alpha.$$

$$-\alpha^2+4\alpha-4\geqslant 0\Big|^{-1} \Rightarrow \alpha^2-4\alpha+4\leqslant 0.$$

$$(\alpha-2)^2\leqslant 0. \Rightarrow \alpha=2.$$ Javob; 1.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(1998.11.41)

Hisoblang.

$$\int_0^{\ln 3}\left(e^{2t}-e^{-\frac{t}{2}}\right)dt.$$

Yechish.

$$\frac{1}{2}e^{2t}+\frac{2}{\sqrt{e^x}}\Big|_0^{\ln 3} \longrightarrow \frac{e^{2\ln 3}}{2}-\frac{e^0}{2}+\frac{2}{\sqrt{e^{\ln 3}}}-\frac{2}{\sqrt{e^0}}.$$

$$\frac{9}{2}-\frac{1}{2}+\frac{2}{\sqrt{3}}-2=\frac{9-1-4}{2}+\frac{2}{\sqrt{3}}.$$

$$\frac{4}{2}+\frac{2}{\sqrt{3}}=2+\frac{2}{\sqrt{3}}. \quad \text{Javob; } 2+\frac{2}{\sqrt{3}}.$$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.10.36)

Integralni Hisoblang.

$$\int_0^1 \frac{e^x+e^{-1}}{e^{x-1}}dx.$$

Yechish.

$$\frac{e^x+\frac{1}{e}}{e^{x-1}}=\frac{\frac{e^{x+1}+1}{e}}{e^{x-1}}=\frac{ee^x+1}{e^x}=e+\frac{1}{e^x}.$$

$$\int edx+\int\frac{1}{e^x}dx.$$

$$ex-\frac{1}{e^x}\Big|_0^1 \longrightarrow e-0-\frac{1}{e}+1=e-\frac{1}{e}+1.$$

Javob; $\frac{e^2-1+e}{e}$.

21.11.1993 MATEMATIKA
ANTARES VY TM★ Ω
ABDULAZIZ
RAHIMOV +998972774773

(1997.6.22)

Hisoblang.

$$\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \cos 2x dx.$$

(Yechish).

$2x=t.$

$$\int \frac{\cos(t)}{2} dt.? \Rightarrow \frac{1}{2}\int \cos t dt.$$

$$\frac{\sin 2x}{2}\Big|_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \longrightarrow \frac{\sin 2\times\frac{\pi}{4}}{2} - \frac{\sin 2\times\frac{\pi}{4}}{2}.$$

$$\frac{-\sin 90^\circ - \sin 90^\circ}{2} = \frac{-1-1}{2} = -\frac{2}{2} = -1. \quad \text{Javob; } -1.$$

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2002.2.35)

$\int_0^{\alpha} x dx \leqslant \alpha+4$ tengsizlikni

qaniatlantiruvchi α ning qiymtlari oralig'i uzunliklarini toping.

Yechish.

$$\frac{x^2}{2}\Big|_0^{\alpha} \longrightarrow \frac{\alpha^2}{2}-0 \leqslant \alpha+4.$$

$$\alpha^2 \leqslant 2\alpha+8.$$

$$\alpha^2-2\alpha-8 \leqslant 0.$$

$$\alpha^2-4\alpha+2\alpha-8 \leqslant 0$$

$$\alpha(\alpha-4)+2(\alpha-4) \leqslant 0.$$

$$(\alpha+2)(\alpha-4) \leqslant 0.$$

$\alpha=-2$. $\alpha=4$.

$2+4=6$. Javob; 6.

21.11.1993 MATEMATIKA
ANTARES VY TM★ Ω
ABDULAZIZ
RAHIMOV +998972774773

(1996.1.31)

Integralni hisoblang.

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \sin dx.$$

(Yechish).

$$-\cos x\Big|_{\frac{\pi}{3}}^{\frac{\pi}{2}} \longrightarrow -\cos\frac{\pi}{2}-\left(-\cos\frac{\pi}{4}\right).$$

$-0+\frac{1}{2}=\frac{1}{2}$. Javob; $\frac{1}{2}$.

(1998.3.29)

Ushbu $v(t)=(t^2+t)$ m/s tezlik bilan to'g'ri chiziq bo'ylab harakatlanayotgan moddiy nuqta dastlabki 6 sek vaqt oralig'da qancha masofani bosib o'tadi?

(Yechish).

$$\int(t^2+t)dt=\frac{1}{3}\int t^2+\frac{1}{2}\int t.$$

$$\frac{1}{3}t^3+\frac{1}{2}t^2=S(t).$$

$$S(6)=\frac{216}{3}+\frac{36}{2}=72+18=90.$$ Javob; 90.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.9.6)

Integralni hisoblang.

$$\int_2^8 \frac{dx}{x\ln 2}.$$

Yechish.

$$\frac{1}{\ln 2}\int \frac{1}{x}dx = \frac{\ln|x|}{\ln 2}.$$

$$\frac{\ln|x|}{\ln 2}\Big|_2^8 \longrightarrow \frac{\ln 8}{\ln 2} - \frac{\ln 2}{\ln 2} = \frac{3\ln 2}{\ln 2} - 1 = 3 - 1 = 2.$$ Javob; 2.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.3.71)

Integralni hisoblang.

$$\int_{-\frac{\pi}{3}}^{-\frac{\pi}{4}} \frac{1}{\cos^2\left(\frac{\pi}{2}+x\right)}.$$

Yechish.

$$\int \frac{1}{-\sin^2 x} = -\operatorname{ctg} x.$$

$$-\operatorname{ctg} x \Big|_{-\frac{\pi}{2}}^{-\frac{\pi}{4}} \longrightarrow \operatorname{ctg}\frac{\pi}{4} - \operatorname{ctg}\frac{\pi}{2}.$$

$1-0=1$. Javob; 1.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(1999.6.24)

Hisoblang.

$$\int_{\frac{2\pi}{3}}^{2\pi} \cos(0{,}25x)dx.$$

Yechish.

$$\int_{\frac{2\pi}{3}}^{2\pi} \cos\left(\frac{x}{4}\right)dx = 4\sin\frac{x}{4}.$$

$$4\sin\frac{x}{4}\Big|_{\frac{2\pi}{3}}^{2\pi} \longrightarrow 4\sin\frac{2\pi}{4} - 4\sin\frac{\frac{2\pi}{3}}{4}.$$

$$4\sin\frac{\pi}{2} - 4\sin\frac{\pi}{6} = 4 - 4\times\frac{1}{2} = 2.$$ Javob; 2.

21.11.1993 MATEMATIKA

ANTARES VY TM★ Ω

ABDULAZIZ
RAHIMOV +998972774773

(1997.10.31)

Hisoblang.

$$\int_{-1}^{0}(1+3x)^2dx.$$

(Yechish).

$$\int 1+6x+9x^2dx.$$

$$\int 1dx+6\int xdx+9\int x^2dx.$$

$$x+3x^2+3x^3\Big|_{-1}^{0} \longrightarrow 0+1+3-3=1.$$ Javob; 1.

21.11.1993 MATEMATIKA
ANTARES VY TM★ Ω
ABDULAZIZ
RAHIMOV +998972774773

(1998.8.32).

Hisoblang.

$$\int_{-\frac{\pi}{2}}^{\pi} |\cos x| dx.$$

Yechish.

$-\frac{\pi}{2} \leqslant x \leqslant \frac{\pi}{2}$. $\cos x \geqslant 0$.

$\frac{\pi}{2} \leqslant x \leqslant \pi$. $\cos x \leqslant 0$.

$$\int_{-\frac{\pi}{2}}^{\pi} |\cos x| dx = \int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \cos(x) dx - \int_{\frac{\pi}{2}}^{\pi} \cos(x) dx.$$

$$\sin x \Big|_{-\frac{\pi}{2}}^{\frac{\pi}{2}} - \sin x \Big|_{\frac{\pi}{2}}^{\pi} = \sin\frac{\pi}{2} + \sin\frac{\pi}{2} - \sin\pi + \sin\frac{\pi}{2}.$$

$1+1-0+1=3$. Javob; 3.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.4.45)

Ikki jisim to'g'ri chiziq bo'ylab bir vaqtning o'zida bitta nuqtadan bir yo'nalishda $V_1(t)=3t^2-5$ (m/s) va $V_2(t)=3t^2+2t+1$ (m/s) qonunyatlarga ko'ra harakatlana boshladi. Harakat boshlanganidan 4 sekund o'tgach, bu jisimlar orasidagi masofa (m) qanchaga teng bo'ladi?

Yechish.

$[0;4]$

$$\int_0^4 (3t^2-5)dx=\int_0^4 (3t^2+2t+1)dx.$$

$$t^3-5t=t^3+t^2+t. \Rightarrow -t^2-6t=0|^{-1}.$$

$$t^2+6t\Big|_0^4 \longrightarrow 16-0+24-0=40.$$ Javob; 40.

21.11.1993 MATEMATIKA
ANTARES VY TM
ABDULAZIZ
RAHIMOV +998972774773

(1997.1.22)

Integralni hisoblang.

$$\int_{-\frac{\pi}{2}}^{0} \cos 3x dx.$$

(Yechish).

$3x=t.$

$$\int_{-\frac{\pi}{2}}^{0} \frac{\cos(t)}{3} dt. \Rightarrow \frac{1}{3} \int_{-\frac{\pi}{2}}^{0} \cos(t) dt.$$

$$\frac{\sin 3x}{3}\Big|_{-\frac{\pi}{2}}^{0} \longrightarrow \frac{\sin 0}{3} + \frac{\sin 3 \times \frac{\pi}{2}}{3} = -\frac{1}{3}.$$

Javob; $-\frac{1}{3}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(1999.4.34)

Hisoblang.

$$\int_{\frac{\pi}{3}}^{\frac{\pi}{2}} \frac{3dx}{2\cos\frac{x}{2}}.$$

Yechish.

$$\frac{3}{2}\int \frac{1}{\cos\frac{x}{2}} = \frac{3}{2} \times \operatorname{tg}\frac{x}{2} = 3\operatorname{tg}\frac{x}{2}.$$

$$3\operatorname{tg}\frac{x}{2}\Big|_{\frac{\pi}{3}}^{\frac{\pi}{2}} \longrightarrow 3\operatorname{tg}\frac{\frac{\pi}{2}}{2} - 3\operatorname{tg}\frac{\frac{\pi}{3}}{2}.$$

$$3\operatorname{tg}\frac{\pi}{4} - 3\operatorname{tg}\frac{\pi}{6} = 3 - \frac{3}{\sqrt{3}} = 3 - \sqrt{3}. \quad \text{Javob; } 3-\sqrt{3}.$$

21.11.1993 MATEMATIKA
ANTARES VY TM*
ABDULAZIZ
RAHIMOV +998972774773

(1997.8.49)

Hisoblang.

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}}(1+\mathrm{ctg}^2 x)\,dx.$$

(Yechish).

$$1+\mathrm{ctg}^2 x=\frac{1}{\sin^2 x}.$$

$$\int_{\frac{\pi}{4}}^{\frac{\pi}{2}}\frac{1}{\sin^2 x}dx=-\mathrm{ctg}x.$$

$$-\mathrm{ctg}x\Big|_{\frac{\pi}{4}}^{\frac{\pi}{2}} \longrightarrow -\mathrm{ctg}\frac{\pi}{2}-\left(-\mathrm{ctg}\frac{\pi}{4}\right).$$

$0+1=1$. Javob; 1.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+998972774773

(1999.5.36)

Hisoblang.

$$\int_0^{\pi} \cos^4 5x dx.$$

Yechish.

$$\cos^4 5x = \left(\frac{1+\cos 10x}{2}\right)^2 = \frac{1+2\cos 10x+\frac{1+\cos 20x}{2}}{4}.$$

$$\frac{2+4\cos 10x+1+\cos 20x}{8}.$$

$$\int\left(\frac{1}{4}+\frac{\cos 10x}{2}+\frac{1}{8}+\frac{\cos 20x}{8}\right)dx$$

$$\frac{3}{8}\int dx+\frac{1}{2}\int \cos 10x dx+\frac{1}{8}\int \cos 20x dx.$$

$$\frac{3x}{8}+\frac{\sin 10x}{20}+\frac{\sin 20x}{160}\Big|_0^{\pi} -> \frac{3\pi}{8}-0+\frac{\sin 10\pi}{20}-0+\frac{\sin 20\pi}{160}-0=\frac{3\pi}{8}.$$

Javob; $\frac{3\pi}{8}$.

21.11.1993 MATEMATIKA
ANTARES VY TM*
ABDULAZIZ
RAHIMOV +998972774773

(1998.7.41)

Hisoblang.

$$\int_{-2}^{0}(|x|+1)dx.$$

Yechish.

$$-\frac{1}{2}\int xdx+\int dx.$$

$$-\frac{1}{2}x^2+x\Big|_{-2}^{0} \longrightarrow 0+2-(0-2).$$

$2+2=4$. Javob; 4.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.5.49)

Agar $\alpha=\int_1^4 \frac{dx}{\sqrt{x}}$ va $b=\int_1^8 \frac{dx}{\sqrt[3]{x}}$ bo'lsa.

αb ko'paytma nechaga teng?

Yechish.

$\alpha=\int \frac{1}{\sqrt{x}}dx=2\sqrt{x}$. $b=\int \frac{1}{\sqrt[3]{x}}dx=\frac{3\sqrt[3]{x^2}}{2}$.

$2\sqrt{x}\Big|_1^4 \longrightarrow 2\sqrt{4}-2\sqrt{1}=4-2=2$. $\alpha=2$.

$\frac{3\sqrt[3]{x^2}}{2}\Big|_1^8 \longrightarrow \frac{3\sqrt[3]{64}}{2}-\frac{3\sqrt[3]{1}}{2}=\frac{12}{2}-\frac{3}{2}=\frac{9}{2}$. $b=\frac{9}{2}$.

$\alpha b=2\times\frac{9}{2}=9$. Javob; 9.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2003.5.48).

$\oint(x)=\int_0^x \cos^2 t\,dt$ funksiyaning

hosilasini toping.

Yechish.

$$\cos^2 t=\frac{1+\cos 2t}{2}=\frac{1}{2}+\frac{1}{2}\cos 2t.$$

$$\frac{1}{2}\int dt+\frac{1}{2}\int \cos 2t\,dt=\frac{1}{2}t+\frac{1}{4}\sin 2t.$$

$$\frac{1}{2}t\Big|_0^x \longrightarrow \frac{x}{2}-0=\frac{x}{2}.$$

$$\frac{\sin 2t}{4}\Big|_0^x \longrightarrow \frac{\sin 2x}{4}.$$

$$\left(\frac{1}{2}x+\frac{\sin 2x}{4}\right)'=\frac{1}{2}+\frac{\cos 2x}{2}=\frac{1+\cos 2x}{2}=\cos^2 x.$$

Javob; $\cos^2 x$.

21.11.1993 MATEMATIKA
ANTARES VY TM* Ω
ABDULAZIZ
RAHIMOV +998972774773

(1997.7.31)

Hisoblang.

$$\int_{-1}^{0}(2x+1)^2dx.$$

(Yechish).

$$\int 4x^2+4x+1dx.$$

$$4\int x^2dx+4\int xdx+\int 1dx.$$

$$\frac{4x^3}{3}+2x^2+x\Big|_{-1}^{0} \longrightarrow 0-\left(-\frac{4}{3}+2-1\right).$$

$$-\left(-\frac{1}{3}\right)=\frac{1}{3}.$$ Javob; $\frac{1}{3}$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.12.52)

Hisoblang.

$$\int_1^3 |x-2|dx.$$

Yechish.

$[1;2]\cup[2;3]$.

$$\int_1^2 (2-x)dx+\int_2^3 (x-2)dx.$$

$$2x-\frac{x^2}{2}\Big|_1^2 \longrightarrow 4-2-2+\frac{1}{2}=\frac{1}{2}.$$

$$\frac{x^2}{2}-2x\Big|_2^3 \longrightarrow \frac{9}{2}-2-6+4=\frac{1}{2}.$$

$\frac{1}{2}+\frac{1}{2}=\frac{2}{2}=1$. **Javob; 1.**

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2000.3.68)

Integralni hisoblang.

$$\int_{-3}^{6} x|x|dx.$$

Yechish.

$[-3;0]\cup[0;6]$.

$$\int_{0}^{6} x^2dx+\int_{-3}^{0} -x^2dx.$$

$$\frac{x^3}{3}\Big|_{0}^{6} \longrightarrow \frac{216}{3}-0=72.$$

$$-\frac{x^3}{3}\Big|_{-3}^{0} \longrightarrow 0-\frac{27}{3}=-9.$$

$72-9=63$. Javob; 63.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2002.10.66)

$\int_0^{2e} \frac{dx}{0{,}5x+1}$ ni hisoblang.

Yechish.

$$\frac{1}{\frac{x}{2}+1}=\frac{1}{\frac{x+2}{2}}=\frac{2}{x+2}.$$

$$2\int\frac{1}{x+2}dx=2\ln(x+2).$$

$$2\ln(x+2)\Big|_0^{2e} \longrightarrow 2\ln(2e+2)-2\ln(0+2).$$

$$2\ln\frac{2e+2}{2}=2\ln\frac{2(e+1)}{2}=2\ln(e+1).$$ Javob; $2\ln(e+1)$.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2002.5.45)

$\int_{-1}^{1} x(1+|x|)dx$ ni hisoblang.

Yechish.

$[-1;0]\cup[0;1]$.

$$\int_{-1}^{0} x(1-x)dx+\int_{0}^{1} x(1+x)dx.$$

$$\int_{-1}^{0} (x-x^2)dx+\int_{0}^{1} (x+x^2)dx.$$

$$\int xdx-\int x^2dx+\int xdx+\int x^2dx.$$

$$\frac{x^2}{2}-\frac{x^3}{3}\Big|_{-1}^{0} \to 0-\frac{1}{2}-0-\frac{1}{3}=-\frac{5}{6}.$$

$$\frac{x^2}{2}+\frac{x^3}{3}\Big|_{0}^{1} \to \frac{1}{2}-0+\frac{1}{3}-0=\frac{5}{6}.$$

$-\frac{5}{6}+\frac{5}{6}=0$. Javob; 0.

21.11.1993
ANTARES VY MATEMATIKA
ABDULAZIZ
RAHIMOV
+9998972774773

(2001.1.38)

Integralni hisoblang.

$$\int_{-4}^{4} x|x|dx.$$

Yechish.

$[-4;0]\cup[0;4]$.

$$\int_{-4}^{0} -x^2dx+\int_{0}^{4} x^2dx.$$

$$\frac{x^3}{3}\Big|_0^4 \longrightarrow \frac{64}{3}-0=\frac{64}{3}.$$

$$-\frac{x^3}{3}\Big|_{-4}^0 \longrightarrow -0-\frac{64}{3}=-\frac{64}{3}.$$

$\frac{64}{3}-\frac{64}{3}=0$. Javob; 0.