ISSN 2181-3187

ANIQ FANLARNI O'QITISHDA, TALABANING KREATIV QOBILIYATINI SHAKLLANTIRISHDA TA'LIM TEXNOLOGIYALARIDAN FOYDALANISH

Shahrisabz davlat pedagogika instituti
Xoshimova D.K, Karamatova M.F
hoshimovadilobar321@gmail.com
maftunakaramatova08.21@gmail.com

Annotatsiya. Ta'lim – tizimli ta'lim olishning eng muhim va ishonchli usuli. Ta'lim o'qituvchi tomonidan boshqariladigan o'ziga xos bilish jarayoni. Aynan o'qituvchining rahbarlik roli o'quvchilar tomonidan bilim, ko'nikma va malakalarni to'liq o'zlashtirishni, ularning aqliy kuchi va ijodiy qobiliyatlarini rivojlantirishni ta'minlaydi. Maqolada ham aniq fanlarni o'qitishda kognitiv qobilyatini shakllantirishning metodik ahamiyati borasida taklif va tavsiyalar beriladi.

Kalit so'zlar: ta'lim, tavsiya, talaba, tahlil, metod, aniq integral, yuza, hajm.

Abstract: Education is the most important and reliable method of systematic education. Education is unique cognitive process controlled by a teacher. It is the leadership role of the teacher that ensures full mastery of knowledge, skills and abilities by students, development of their mental strength and creative abilities. The article also gives suggestions and recommendations regarding the methodical importance of forming the cognitive ability of the student in the teaching of specific sciences.

Key words: education, recommendation, student, analysis, method, exact integral,surface, volume.

Аннотация. Образования является наиболее важным и надежным методом систематического образования. Обучение – это уникальный познавательный процесс, управляемый учителем. Именно руководящая роль учителя обеспечивает полное овладение учащимся знаниями , умениями и навыками, развитие их душевных сил и творческих способности школьника при обучении конкретным наукам.

Ключевые слова: образование, рекомендация, студент, анализ, метод, определьённый интеграль, площадь. обём.

Innovatsion pedagogik texnologiyalarning rivojlanishi va uning o'quv - tarbiya jarayoniga kirib kelishi, shuningdek axborot texnologiyalarining rivojlanishi jarayonida har bir pedagog – o'qituvchi o'z kasbiy tayyorgarligini, pedagogik mahoratini oshirib borishini taalb etadi. Uzluksiz ta'lim chuqur, har taraflama asosli ta'lim tarbiya berish mutaxasssis kadrlar tayyorlashning turli shakl uslub va sifatini

ISSN 2181-3187

turli komponentlar o'rtasidagi o'zaro aloqadorlik muayyan usullarni ta'lim jarayoniga oqilona tatbiq etilishini ta'minlaydi.

Aniq fanlarni o'zlashtirishda talabalar umumta'lim va boshqa fanlardan o'zlashtirgan bilimlariga asoslanadilar. Zamonaviy texnologiyalari va mutaxassislik kafedralar bilan uzviy bog'liqlikni va uzliksizlikni ta'minlash muhim hisoblanadi.

Matematik bilimlarni mustahkamlashda ayniqsa, keng tarqalgan va o'ziga xos xususiyatga ega bo'lgan ta'limning faol usullariga quyidagilar kiradi: suhbat, munozara, ta'limiy o'yinlar, "keys-study", loyihalash usuli , miyaga hujum va boshqalar.

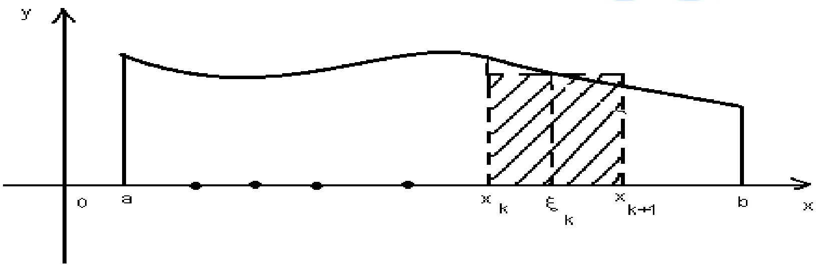
Matematika fani xalq xo'jaligi, texnikaning rivojlanishida asosiy va alohida o'rin egallaydi. U xalq xo'jaligi va texnikaning turli sohalarida: jumladan, turli loyihalarni modellashtirishda va katta o'lchamli maydonlarning sathini aniqlashda, katta mehnat talab qilinadigan inshootlarning loyihasini hisoblashda va ularga ketadigan sarf-harajatlarni muqobillashtirishda yuqori ahamiyatga egadir.

Ushbu maqolada "Matematik analiz " fanining "Aniq integral va uning tatbiqlari" mavzusini o'zlashtirishda "keys-study" metodidan foydalanib, ushbu mavzuni talabalarga yanada mukaammalroq tushuntirish tadqiq qilingan.

1. Tekis shaklning yuzi.

Aytaylik, $f(x)$ funksiya $[a,b]$ da uzluksiz bo'lib, $\forall x \in [a,b]$ uchun $f(x) \geq 0$ bo'lsin.

Yuqoridan $f(x)$ funksiya grafigi, yon tomonlardan $x=a,\ x=b$ vertikal chiziqlar hamda pastdan Ox o'qi bilan chegaralangan D shaklni qaraylik. (1-chizma)



1-chizma

$[a,b]$ segmentning biror $P=\{x_0, x_1, x_2, ..., x_n\}$

$$(a = x_0 < x_1 < ... < x_k < x_{k+1} < ... < x_n = b)$$

bo'laklashni olamiz. Bo'laklashning har bir

$$[x_k, x_{k+1}] \quad (k = 0,1,2,...,n-1)$$

bo'lagidagi ixtiyoriy ξ_k nuqtada $f(x)$ funksiya qiymati $f(\xi_k)$ ni shu bo'lakcha uzunligiga ko'paytiramiz:

$$f(\xi_k)(x_{k+1} - x_k) = f(\xi_k)\Delta x_k.$$

ISSN 2181-3187

Bu miqdor asosi Δx_k balandligi $f(\xi_k)$ ga teng bo‘lgan to‘g‘ri to‘rtburchakning yuzini ifodalaydi (1-chizma). Yuqoridagidek, asoslari

$$\Delta x_0 = x_1 - x_0,\ \Delta x_1 = x_2 - x_1,\ \dots,\ \Delta x_{n-1} = x_n - x_{n-1}$$

balandliklari mos ravishda $f(\xi_0),\ f(\xi_1),\ \dots,\ f(\xi_{n-1})$

bo‘lgan to‘g‘ri to‘rtburchaklar yuzalari topilib, ularning yig‘indisidan iborat ushbu

$$\sum_{k=0}^{n-1} f(\xi_k)\Delta x_k \qquad (1)$$

miqdor qaralsa, uni taxminan D shaklning yuzi deb olish mumkin bo‘ladi.

Ayni paytda (1) $f(x)$ funksiyaning integral yig‘indisi bo‘ladi. Ma’lumki, $f(x)$ funksiya $[a,b]$ da uzluksiz bo‘lsa, (1) yig‘indining limiti mavjud va

$$\lim_{\lambda\to 0}\sum_{k=0}^{n-1} f(\xi_k)\Delta x_k = \int_a^b f(x)dx$$

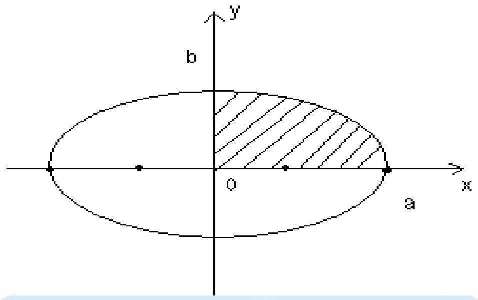
bo‘ladi. Demak, qaralayotgan D shakl yuzaga ega va uning yuzi S ushbu

$$S = \int_a^b f(x)dx \qquad (2)$$

formula bilan topiladi

Misol 1. Ushbu $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ ellips va Ox, Oy o‘qlarining musbat yo‘nalishlaridagi qismlari bilan chegaralangan shaklning yuzi topilsin.

◃ Misolda aytilgan shakl 2- chizmada tasvirlangan.



2-chizma

Ravshanki, qaralayotgan shaklning yuzi ellips yuzining $\frac{1}{4}$ qismi bo‘lib, u

$$y = \frac{b}{a}\sqrt{a^2 - x^2} \qquad (0 \le x \le a)$$

funksiya grafigi hamda $x = 0,\ x = a$ lar bilan chegaralangan shakldir.

(2) formulaga ko‘ra

$$S = \int_a^b \frac{b}{a}\sqrt{a^2 - x^2}dx$$

ISSN 2181-3187

bo‘ladi. Endi integralni hisoblaymiz:

$$\int_a^b \frac{b}{a}\sqrt{a^2-x^2}\,dx = \frac{b}{a}\int_a^b \sqrt{a^2-x^2}\,dx = \left[\begin{matrix} x = a\sin t & x = 0\,\text{da} & t = 0 \\ dx = a\cos t & x = a\,\text{da} & t = \dfrac{\pi}{2} \end{matrix}\right] =$$

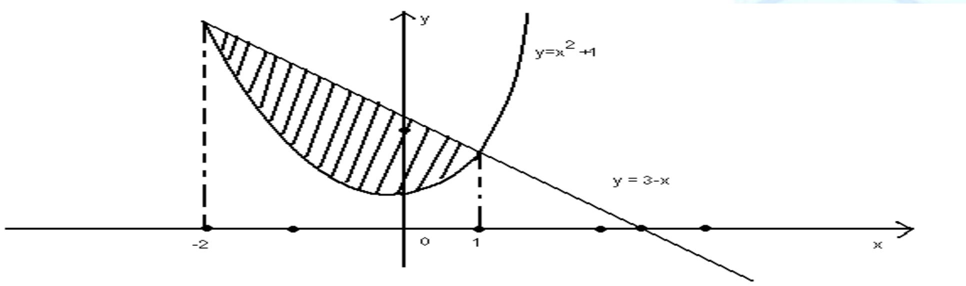
$$= \frac{b}{a}\int_0^{\frac{\pi}{2}} \sqrt{a^2 - a^2\sin^2 t}\cdot a\cos t dt = \frac{b}{a}a^2\int_0^{\frac{\pi}{2}}\cos^2 t dt = ab\int_0^{\frac{\pi}{2}}\left(\frac{1}{2}+\frac{1}{2}\cos 2t\right)dt =$$

$$= \frac{1}{2}ab\cdot\frac{\pi}{2} + \frac{1}{2}ab\cdot\frac{\sin 2t}{2}\Bigg|_0^{\frac{\pi}{2}} = \frac{\pi ab}{4}.$$

Demak, $S = \dfrac{\pi ab}{4}$. ▷

Misol 2. Ushbu $y = x^2 + 1,\ \ x + y = 3$ chiziqlar bilan chegaralangan shaklning yuzi topilsin.

◁ $y = x^2 + 1$ parabola hamda $x + y = 3$ to‘g‘ri chiziqlar bilan chegaralangan shakl quyidagi 3-chizmada tasvirlangan



3-chizma

Parabola va to‘g‘ri chiziq tenglamalarini sistema qilib,

$$\begin{cases} y = x^2 + 1, \\ x + y = 3 \end{cases}$$

so‘ng uni yechib, $x_1 = -2,\ x_2 = 1$ bo‘lishini topamiz. Endi

$$a = -2,\ b = 1,\ f_1(x) = x^2 + 1,\ f_2(x) = 3 - x$$

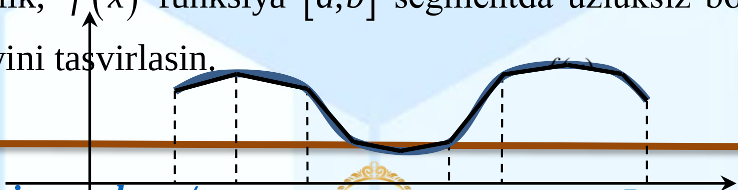
deb, (3) formuladan foydalanib, izlanayotgan shakl yuzi S ni topamiz:

$$S = \int_{-2}^{1}\left[(3-x)-\left(x^2+1\right)\right]dx = \int_{-2}^{1}\left(2-x-x^2\right)dx = \left(2x - \frac{x^2}{2} - \frac{x^3}{3}\right)\Bigg|_{-2}^{1} =$$

$$= 2 - \frac{1}{2} - \frac{1}{3} - \left(-4 - \frac{4}{2} + \frac{8}{3}\right) = 4\frac{1}{2}.\ ▷$$

2. Yoy uzunligi.

Faraz qilaylik, $f(x)$ funksiya $[a,b]$ segmentda uzluksiz bo‘lib, uning grafigi tekislikda $\breve{AB}$ yoyini tasvirlasin.



ISSN 2181-3187

4-chizma.

$[a,b]$ segmentning biror $P=\{x_0,x_1,x_2,...,x_n\}$

$$\left(a=x_0<x_1<...<x_k<x_{k+1}<...<x_n=b\right)$$

bo‘laklashni olamiz. Bo‘laklashning har bir bo‘laklovchi

$$x_k \quad (k=0,1,2,...,n)$$

nuqtalaridan Oy o‘qiga parallel to‘g‘ri chiziqlar o‘tkazib, ularni $\breve{AB}$ yoyi bilan kesishgan nuqtalarini

$$A_k=A_k\left(x_k,f\left(x_k\right)\right) \qquad (k=0,1,2,...,n)$$

bilan belgilaymiz. Natijada $\breve{AB}$ yoyida

$$A_0\left(x_0,f\left(x_0\right)\right),A_1\left(x_1,f\left(x_1\right)\right),...,A_k\left(x_k,f\left(x_k\right)\right),A_{k+1}\left(x_{k+1},f\left(x_{k+1}\right)\right),...,A_n\left(x_n,f\left(x_n\right)\right)$$

nuqtalar hosil bo‘ladi $\left(A=A_0\left(a,f\left(a\right)\right),\ B=A_n\left(b,f\left(b\right)\right)\right)$.

Ushbu $\lim\limits_{\lambda\to 0}\sum\limits_{k=0}^{n-1}\sqrt{\left(x_{k+1}-x_k\right)^2+\left(f\left(x_{k+1}\right)-f\left(x_k\right)\right)^2}$

limit mavjud bo‘lsa, $\breve{AB}$ yoy uzunlikka ega, limitning qiymati $\breve{AB}$ yoyining uzunligi deyiladi.

Aytaylik, $f\left(x\right)$ funksiya uzluksiz $f'\left(x\right)$ hosilaga ega bo‘lsin. Lagranj teoremasidan foydalanib topamiz:

$$f\left(x_{k+1}\right)-f\left(x_k\right)=f'\left(\xi_k\right)\left(x_{k+1}-x_k\right) \quad \left(x_k\le\xi_k\le x_{k+1}\right)$$

Natijada

$$\sum_{k=0}^{n-1}\sqrt{\left(x_{k+1}-x_k\right)^2+\left(f\left(x_{k+1}\right)-f\left(x_k\right)\right)^2}=\sum_{k=0}^{n-1}\sqrt{\left(x_{k+1}-x_k\right)^2+f'^2\left(\xi_k\right)\left(x_{k+1}-x_k\right)^2}=$$

$$=\sum_{k=0}^{n-1}\sqrt{1+f'^2\left(\xi_k\right)}\cdot\left(x_{k+1}-x_k\right)=\sum_{k=0}^{n-1}\sqrt{1+f'^2\left(\xi_k\right)}\cdot\Delta x_k$$

bo‘ladi. Shunday qilib, $\breve{AB}$ yoyi uzunlikka ega va uning uzunligi

$$\ell=\int_a^b\sqrt{1+f'^2\left(x\right)}dx. \text{ ga teng} \qquad (3)$$

Misol 3. Ushbu $\begin{matrix}\varphi\left(t\right)=a\left(t-\sin t\right),\\ \psi\left(t\right)=a\left(1-\cos t\right)\end{matrix} \qquad \left(0\le t\le\pi\right)$

tenglamalar sistemasi bilan aniqlangan yoyning (sikloidaning) uzunligi topilsin.

◁ Ravshanki, $\varphi'\left(t\right)=a\left(1-\cos t\right),\quad \psi'\left(t\right)=a\sin t$

bo‘lib, $\sqrt{\varphi'^2\left(t\right)+\psi'^2\left(t\right)}=\sqrt{a^2\left(1-\cos t\right)^2+a^2\sin^2 t}=a\sqrt{2\left(1-\cos t\right)}$

ISSN 2181-3187

bo‘ladi. Endi $\alpha = 0,\ \beta = 2\pi$ deb,

(3) formuladan foydalanib, egri chiziqning uzunligini topamiz:

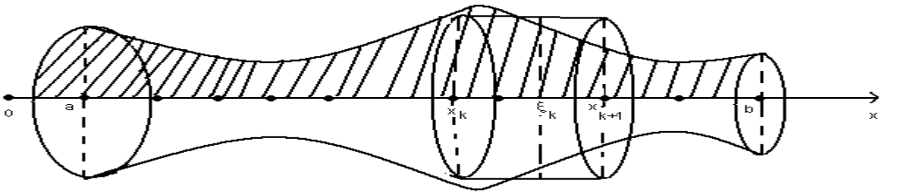
$$\ell = \int_{\alpha}^{\beta} \sqrt{\varphi'^2(t) + \psi'^2(t)}dt = \int_0^{2\pi} a\sqrt{2(1-\cos t)}dt = a\int_0^{2\pi}\sqrt{4\cdot\sin^2\frac{t}{2}}dt =$$

$$= 2a\int_0^{2\pi}\sin\frac{t}{2}\cdot d\left(\frac{t}{2}\right)\cdot 2 = -4a\cos\frac{t}{2}\Big|_0^{2\pi} = -4a(\cos\pi - \cos 0) = 8a. \ \triangleright$$

3. Aylanma jismning hajmi.

Aytaylik, $f(x)$ funksiya $[a,b]$ da uzluksiz bo‘lib, unda $f(x) \geq 0$ bo‘lsin. Yuqoridan $f(x)$ funksiya grafigi, yon tomonlaridan $x = a,\ x = b$ vertikal chiziqlar hamda pastdan Ox o‘qi bilan chegaralangan tekis shaklni Ox o‘qi atrofida aylantirishdan aylanma jism hosil bo‘ladi.

Masalan, quyidagi chizmada tasvirlangan shaklni Ox o‘qi atrofida aylantirishdan quyidagi aylanma jism hosil bo‘ladi:



6-chizma

$[a,b]$ segmentning biror $P = \{x_0, x_1, x_2, ..., x_n\}$

$$(a = x_0 < x_1 < x_2 < ... < x_k < x_{k+1} < ... < x_n = b)$$

bo‘laklashni olamiz. Bo‘laklashning har bir

$$[x_k, x_{k+1}] \quad (k = 0,1,2,...,n-1)$$

bo‘lagidagi ixtiyoriy ξ_k nuqtada $f(x)$ funksiya qiymati $f(\xi_k)$ ni topib, ushbu

$$\pi f^2(\xi_k)\cdot\Delta x_k$$

miqdorni qaraymiz. Bu miqdor, asosining radiusi $f(\xi_k)$ balandligi Δx_k ga teng bo‘lgan silindrning hajmini ifodalaydi. Bundan ko‘rinadiki,

$$\sum_{k=0}^{n-1}\pi f^2(\xi_k)\Delta x_k$$

miqdorni taxminan qaralayotgan aylanma jismning hajmi deb qarash mumkin.

Endi $[a,b]$ segmentning bo‘laklash nuqtalarining sonini shunday orttiraboraylikki, bunda $\max\{\Delta x_k\}$ nolga intilaborsin. U holda

$$\sum_{k=0}^{n-1}\pi f^2(\xi_k)\Delta x_k$$

ISSN 2181-3187

yig'indining qiymati ham o'zgaraboradi va u tobora aylana jismning hajmini aniqroq ifodalaydi.

Ushbu $V=\lim\limits_{\lambda\to 0}\sum\limits_{k=0}^{n-1}\pi f^2(\xi_k)\Delta x_k$ limit aylanma jismning hajmi deyiladi.

Ayni paytda $\lim\limits_{\lambda\to 0}\sum\limits_{k=0}^{n-1}\pi f^2(\xi_k)\Delta x_k=\pi\int\limits_a^b f^2(x)dx$ tenglik o'rinlibo'ladi.

Demak, aylana jismning hajmi $V=\pi\int\limits_a^b f^2(x)dx$ (4)

bo'ladi.

Misol 4. Radiusi r ga teng bo'lgan shar hajmi topilsin.

◁ Bu sharni ushbu $f(x)=\sqrt{r^2-x^2}$, $-r\le x\le r$

yarim doiraning Ox o'qi atrofida aylantirishidan hosil bo'lgan jism deb qarash mumikn.

() formuladan foydalanib topamiz:

$$V=\pi\int\limits_{-r}^{r}(r^2-x^2)dx=\pi\left(r^2x-\frac{x^3}{3}\right)\Bigg|_{-r}^{r}=\pi\left[\left(r^3-\frac{r^3}{3}\right)-\left(-r^3+\frac{r^3}{3}\right)\right]=\frac{4}{3}\pi r^3.\ \triangleright$$

4. Aniq integralning iqtisodiy ma'nosini anglash uchun, $y=f(t)$ funksiya biron bir ishlab chiqarishda mehnat unumdorligining vaqt davomida o'zgarishini aniqlasin deb qaraymiz. U holda $[0,T]$ vaqt oralig'ida mahsulot miqdori hajmi u ni hisoblash uchun $[0,T]$ oraliqni $0=t_0<t_1<t_2<\ldots<t_{n-1}<=T$ nuqtalar bilan kichik bo'lakchalarga bo'lib, $[t_i,t_{i+1}]$ kichik oraliqda mehnat unumdorligini taqriban o'zgarmas $f(\xi_i)$ ga $(\xi_i\in[t_i,t_{i+1}])$ teng deb $[t_i,t_{i+1}]$ oraliqda ishlab chiqarilgan mahsulot hajmi $\Delta u_i\approx f(\xi_i)\cdot\Delta t_i$ $(\Delta t_i=t_{i+1}-t_i)$ ekanligini hisobga olib, butun $[0,T]$ oraliqda ishlab chiqarilgan mahsulot miqdori u uchun quyidagi taqribiy tenglikni hosil qilamiz:

$$u=\sum_{i=0}^{n-1}\Delta u_i\approx\sum_{i=0}^{n-1}f(\xi_i)\Delta t_i$$

Bu tenglikda aniqlikni oshirish uchun $\max\Delta t_i\to 0$ da limitga o'tishimiz lozim. U holda,

$$u=\int\limits_0^T f(t)dt\ .$$

Bu tenglik $[0,T]$ vaqt davomida ishlab chiqarilgan mahsulot miqdorining hajmi u, $f(t)$ - mehnat unumdorligi funksiyasi $f(t)$ ning aniq integrali orqali ifoda yetilar ekan. Bu integral son jihatidan $f(t)$ funksiya va $[0,T]$ oraliqlar hosil qilgan egri chiziqli trapetsiya yuziga teng bo'ladi.

ISSN 2181-3187

$y = f(x)$ funksiya uchun $\int_a^b f(x)dx$ integral qaysi shartlarda mavjud bo‘lishligini qaraymiz.

KEYS- STADI METODI

O’quv predmeti: Matematik analiz

Mavzu: Aniq integralning tadbiqlari

Keysning asosiy maqsadi:

- aylanish jismining xajmini hisoblashni o’rganish;
- yuzalarni hisoblashni o’rganish;
- yoy uzunligini hisoblashni o’rganish.

O‘quv faoliyatidan kutiladigan natijalar:

- Yuzalarni hisoblashni o’rganish;
- Yoy uzunligini hisoblashni o’rganish;
- Hajmlarni hisoblashni o‘rganish;
- Talabalarga aniq integralni ba’zi bir fizik, geometrik va boshqa kattaliklarni hisoblashda qo’llashni o’rgatish.

Ushbu keysni muvaffaqiyatli amalga oshirish uchun oldindan talabalar quyidagi bilim va ko‘nikmalarga ega bo‘lmoqlari zarur:

Talaba bilishi kerak:

-matematikaning boshlang‘ich tushunchalari, matematik formulalarni va xossalarni;

Talaba amalga oshirishi kerak:

- mavzuni mustaqil o‘rganadi; muammoning mohiyatini aniqlashtiradi; g‘oyalarni ilgari suradi; ma’lumotlarni tanqidiy nuqtai nazardan ko‘rib chiqib, mustaqil qaror qabul qilishni o‘rganadi; o‘z nuqtai nazariga ega bo‘lib, mantiqiy xulosa chiqaradi; o‘quv ma’lumotlar bilan mustaqil ishlaydi; ma’lumotlarni taqqoslaydi, tahlil qiladi va umumlashtiradi;

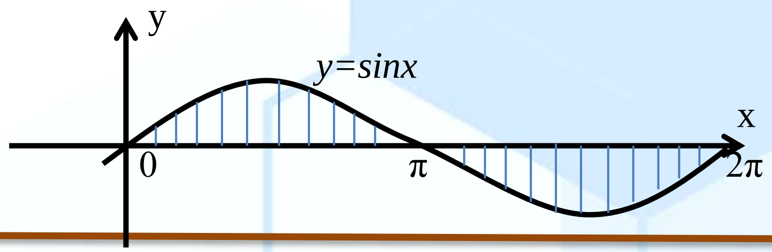
Talaba ega bo‘lmog‘i kerak:

- kommunikativ ko‘nikmalarga; taqdimot ko‘nikmalariga; hamkorlikdagi ishlar ko‘nikmalariga; muammoli holatlar tahlil qilish ko‘nikmalariga, amaliyotda va ishlab chiqarishda aniq integrallarni tadbiqlaridan foydalana olishi.

Aniq integral tadbiqlari mavzusining keyslari

Keys 1

$0 \leq x \leq 2\pi$ bo’lganda $y = sinx$ sinusoida va OX o’qi bilan chegaralangan Q yuza hisoblansin.



ISSN 2181-3187

Keys 1 ishlanmasi

$0 \le x \le \pi$ bo'lganda $sinx \ge 0, \pi \le x \le 2\pi$ bo'lganda esa $sinx \le 0$ bo'lgani sababli

$$Q = \int_0^{\pi} sinxdx + \left|\int_{\pi}^{2\pi} sinxdx\right| = \int_0^{2\pi} |sinx|dx,$$

$$\int_0^{\pi} sinxdx = -cosx\Big|_0^{\pi} = -(cos\pi - cos0) = -(-1-1) = 2,$$

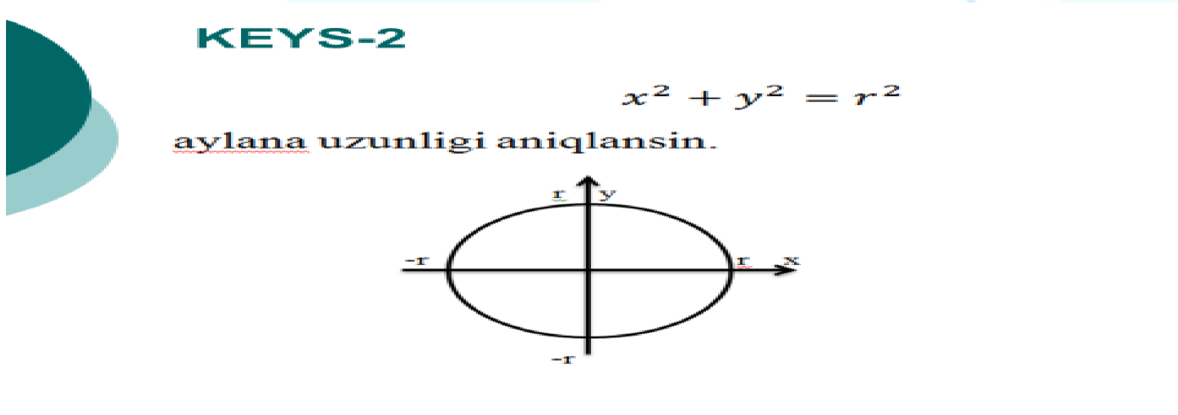
$$\int_{\pi}^{2\pi} sinxdx = -cosx\Big|_{\pi}^{2\pi} = -(cos2\pi - cos\pi) = -2.$$

Demak, $Q = 2 + |-2| = 4$.

Keys 2

$x^2 + y^2 = r^2$ aylana uzunligi aniqlansin.

Keys 2 ishlanmasi



Dastlab aylananing birinchi kvadratda yotgan to'rtdan bir qismining uzunligini hisoblaymiz. U holda *AB* yoyning tenglamasi:

$$y = \sqrt{r^2 - x^2},$$

bundan

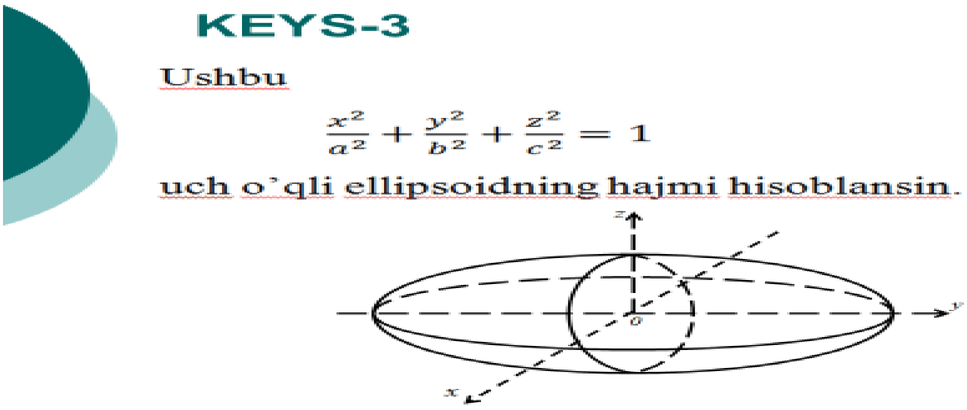
$$\frac{dy}{dx} = -\frac{x}{\sqrt{r^2-x^2}}.$$

Demak, $\frac{1}{4}s = \int_0^r \sqrt{1 + \frac{x^2}{r^2-x^2}}dx = \int_0^r \frac{r}{\sqrt{r^2-x^2}}dx = rarcsin\frac{x}{r}\Big|_0^r = r\frac{\pi}{2}.$

Butun aylananing uzunligi $s = 2\pi r$.

Keys 3

ISSN 2181-3187



Ushbu $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$ uch o'qli ellipsoidning hajmi hisoblansin.

Keys 3 ishlanmasi

Ellipsoidni *Oyz* tekislikka parallel bo'lib undan *x* masofada uzoqlikdan o'tgan tekislik bilan kesganda $\frac{y^2}{b^2}+\frac{z^2}{c^2}=1-\frac{x^2}{a^2}$ yoki yarim o'qlari

$$b_1=b\sqrt{1-\frac{x^2}{a^2}},\qquad c_1=c\sqrt{1-\frac{x^2}{a^2}}$$

bo'lgan ellips

$$\frac{y^2}{\left[b\sqrt{1-\frac{x^2}{a^2}}\right]^2}+\frac{z^2}{\left[c\sqrt{1-\frac{x^2}{a^2}}\right]^2}=1$$

hosil bo'ladi.

Ammo bunday ellipsning yuzi $\pi b_1 c_1$ ga teng. Shuning uchun:

$$Q(x)=\pi bc\left(1-\frac{x^2}{a^2}\right).$$

Ellipsoidning hajmi: $v=\pi bc\int_{-a}^{a}\left(1-\frac{x^2}{a^2}\right)dx=\pi bc\left(x-\frac{x^3}{3a^2}\right)\Big|_{-a}^{a}=\frac{4}{3}\pi abc.$

Agar $a=b=c$ bo'lsa, ellipsoid sharga aylanadi,

bu holda $v=\frac{4}{3}\pi a^3$ ni hosil qilamiz.

ADABIYOTLAR RO'YXATI

1. Худойберганов Г.,Ворисов А.,Мансуров Х.,Шоимкулов Б., Математик анализдан маърузалар. I,II қисм, Тошкент 2010 йил.
2. Egamberdiyev B., Isanov R. Sh. Oliy matematikadan hisob-grafik ishlarning misol va masalalarini yechish. I-qism. Toshkent, 2009
3. Шоимқулов Б.А.,Туйчиев Т.Т., Джумабоев Д.Х. «Математик анализдан мустақил ишлари», 2008й.

ISSN 2181-3187

4. Yo'ldoshev J .G'., Usmonov S.A. Pedagogik texnologiya asoslari. T., O'qituvchi, 2004.-102 b
5. Курбанов Ш., Сейтхалилов Э. Национальная программа по подготовке кадров. Т., Университет, 2000. -103 с.
6. Begimqulov U.SH. Pedagogik ta'limda zamonaviy axborot texnologiyalarini joriy etishning ilmiy-nazariy asoslari. T., Fan, 2007. -143 b.