MATEMATIK TA’LIM: O‘QITISHDA INNOVATSION USULLAR

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Annotatsiya: Maqola matematikadan amaliy mashg’ulotlarda darslarning samaradorligini yanada oshirish maqsadida zamonaviy axborot texnologiyalari vositalaridan maqsadli foydalanish, xususan kompyuter o’quv dasturlarini qo’llashga doir namunalarga bag’ishlangan.

Kalit so‘zlar: axborot texnologiyalari, dastur, Geogebra, MS Excel, determinant, vektor, tekislik, sirt, aylana, parabola.

KIRISH

Hozirgi kun talablariga bog’liq holda, kundan-kunga axborotlar hajmi ortib bormoqda. Zamonaviy axborot texnologiyalari muhiti tobora faollashib, kengayib bormoqda. Doimiy ravishda ortib borayotgan axborotlar ko’lami o’quvchitalabalarning intellektual axborot madaniyati - qobiliyatini yanada tarbiyalashga undaydi. Shuningdek, faqatgina o„quvchi-talabalarnigina emas, balki o’qituvchilarning ham kompyuter dasturlari va ularni ifoda etish vositalarini, multimedia texnologiyalarini qo„llash malakalarini yanada faollashtirishni taqazo etadi. Bu bilan esa darslarning amaliy samaradorligini yanada oshirish imkoniyatlari ochiladi.

ADABIYOTLAR TAHLILI VA METODOLOGIYA

Hozirda, ayniqsa matematik ta’limning zamon talablariga javob berishining zaruriy shartlaridan biri axborot texnologiyalarining ilg’or resurslaridan samarali foydalanishdir. Bu sohada bir qator ishlarda, masalan [1-5] adabiyotlarda dars jarayonida axborot texnologiyalari imkoniyatlaridan foydalanishni to’g’ri tashkil etish, uning g’oyalari to’g’risida, shuningdek ba’zi mavzularni o’qitish uslublari haqida ijobiy fikrlar bildirilgan.

MUHOKAMA VA NATIJALAR

Ushbu maqolada matematikadan amaliy mashg„ulotlar mazmunini yanada chuqurlashtirishga xizmat qiluvchi, matematikaning asosiy tushunchalariga oid tipik masalalarni MS Excel, Geogebra kabi kompyuter dasturlarini qo„llab yechishga na‟munalar, hisoblash qoidalari va tegishli yo„llanmalari keltiriladi. 1-masala. Determinant hisoblansin:

1-masala. Determinant hisoblansin:

$$\begin{matrix} 1 & -2 & 3 \\ 2 & 1 & -4 \\ 3 & -4 & -1 \end{matrix}$$

Hisoblashni bajarish uchun MS Excel dasturini ishga tushiramiz, bunda “МОПРЕД(массив)” funksiyasidan foydalanib yechamiz. Hisoblashni quyidagi qoida bo,,yicha olib boramiz:

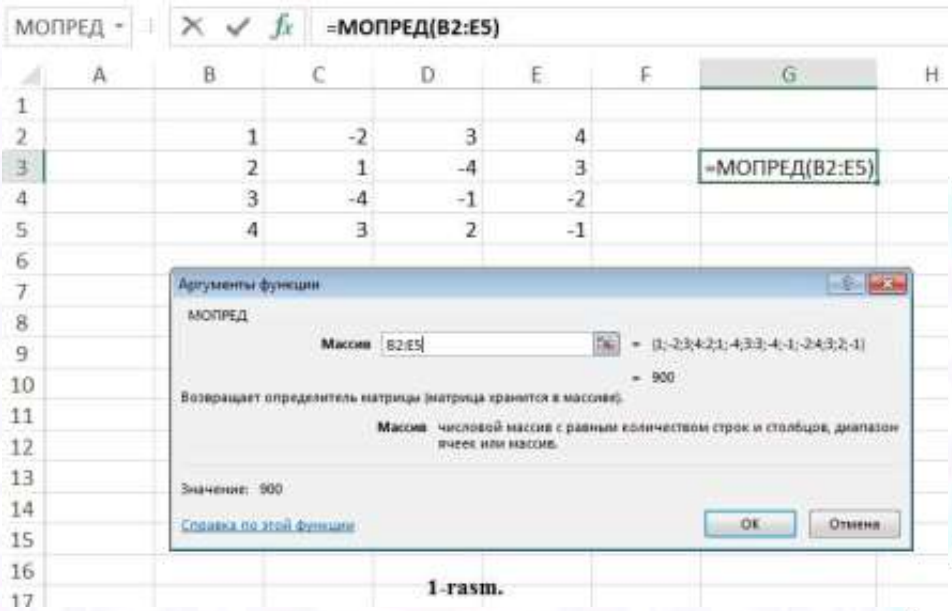
1) Berilgan determinantni jadval ko’rinishida kiritib olamiz;

2) determinant qiymati yozilishi kerak bo’lgan bo’sh yacheykani tanlab, belgilab olamiz;

3) “Мастер функция” ni faollashtiramiz (bosh menyuda “Вставка/Функции” ni tanlaymiz);

4) kategoriyalar oynasidagi «Математические функции» dan “МОПРЕД(массив)” ni tanlab, OK tugmasini bosamiz;

5) funksiyaning argumentiga yuqoridagi jadvalning adresini kiritamiz, (masalan B2:E5) va OK tugmasini bosamiz, avtomatik ravishda natija hosil bo’ladi (1-rasm).



1-rasm.

2-masala. Tenglamalar sistemasi yechilsin:

$$\begin{cases} 5x + 8y - z = -7 \\ x + 2y + 3z = 1 \\ 2x - 3y + 2z = 9 \end{cases}$$

Tenglamalar sistemasini matrisa usulida MS Excel dasturini qo,,llab yechish qoidasi quyidagi tartibda bajariladi:

1) Misoldagi tenglamalar sistemasining koeffisiyentlarini jadval ko’rinishda kiritib olamiz, masalan B5:D7 massiv (2-rasm);

2) asosiy matrisaga teskari matrisaning qiymati yozilishi kerak bo’lgan bo’sh yacheykani (masalan B9:D1) tanlab, belgilab olamiz;

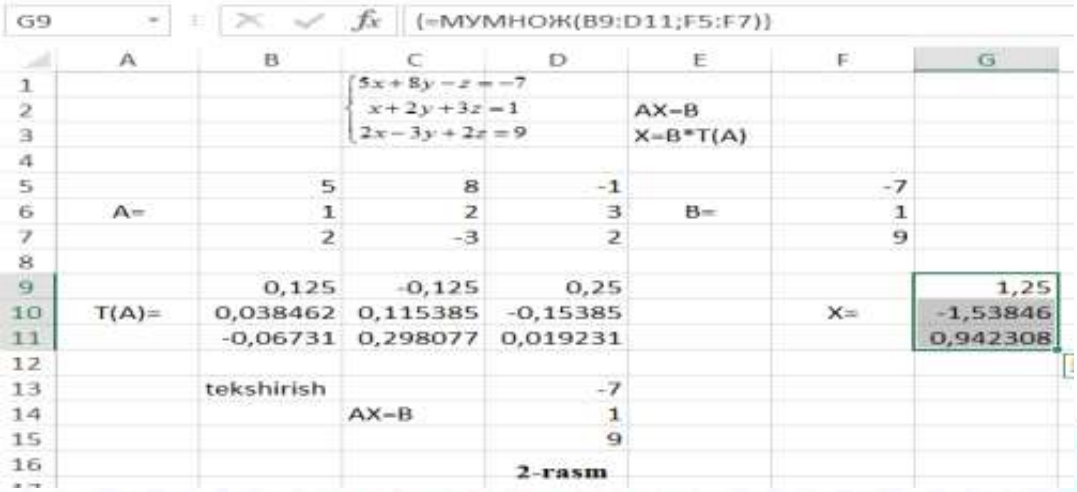
3) “Мастер функция”ni faollashtiramiz (bosh menyuda “Вставка/Функции” ni tanlaymiz);

4) kategoriyalar oynasidan «Математические функции» dan “МОБР(массив)” ni tanlab, OK tugmasini bosamiz;

5) funksiyaning argumentiga yuqoridagi jadvalning adresini kiritamiz, (masalan B5:D7) va OK tugmasini bosamiz (2-rasm).

6) kursorni B9 ga qo’yib, F2 va ctrl+shift +enter ni bossak, T(A) ning barcha elementlari ko„rinadi.

7) kursorni G9:G11 ga qo„yib, МУМНОЖ(массив1; массив2) funksiyasini tanlab, «массив1» ga teskari matrisa adresi B9:D11 ni, «массив2» ga B ustun matrisa adresi F5:F7 ni kiritamiz va OK tugmasini bosamiz. Natigada G9:G11 da sistemaning yechimi hosil bo’ladi.



3-masala. Berilgan (1;3), (3;5) va (5;10) nuqtalardan o„tuvchi parabola tenglamasini yozing.

MS Excel dasturini qo’llaylik. Tekislikda joylashgan parabolaninig umumiy tenglamasini $y = ax^2 + bx+c$ ko’rinishda olib, bu tenglamaga berilgan uchta nuqta koordinatalarini qo’yish bilan a, b, c larga nisbatan uch noma’lumli uchta tenglamaga ega bo’lamiz:

$$a + b + c = 3$$
$$9a + 3b + c = 5$$
$$25a + 5b + c = 10$$

va ularni birgalikda yechib, a, b, c larni topamiz. Buning uchun Kramer formulalaridan va “МОПРЕД(массив)” funksiyasidan foydalanamiz. Hisoblash qoidasi quyidagicha:

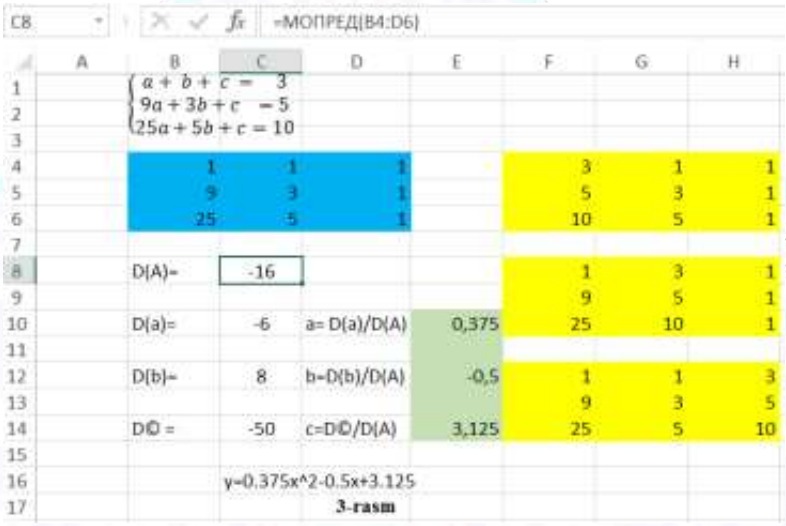
1) Yuqoridagi tenglamalar sistemasi koeffisientlarini jadval ko’rinishida B4:D6 ga kiritib olamiz (3-rasm);

2) determinant qiymati yozilishi kerak bo„lgan bo„sh yacheyka C8 ni tanlab, belgilab olamiz;

3) “Master funksiya”ni faollashtiramiz (bosh menyuda “Вставка/Функции” ni tanlaymiz);

4) kategoriyalar oynasidan «Математические функции» dan “МОПРЕД(массив)” ni tanlab, argumentga yuqoridagi sistemaning bosh determinanti adresi B4:D6 ni kiritamiz va OK tugmasini bosamiz;

5) natijada C8 da bosh determinant -16 qiymat hosil bo’ladi, Kramer formulalaridahi yordamchi determinantlar qiymatlar ham shu usulda topiladi (3- rasm).



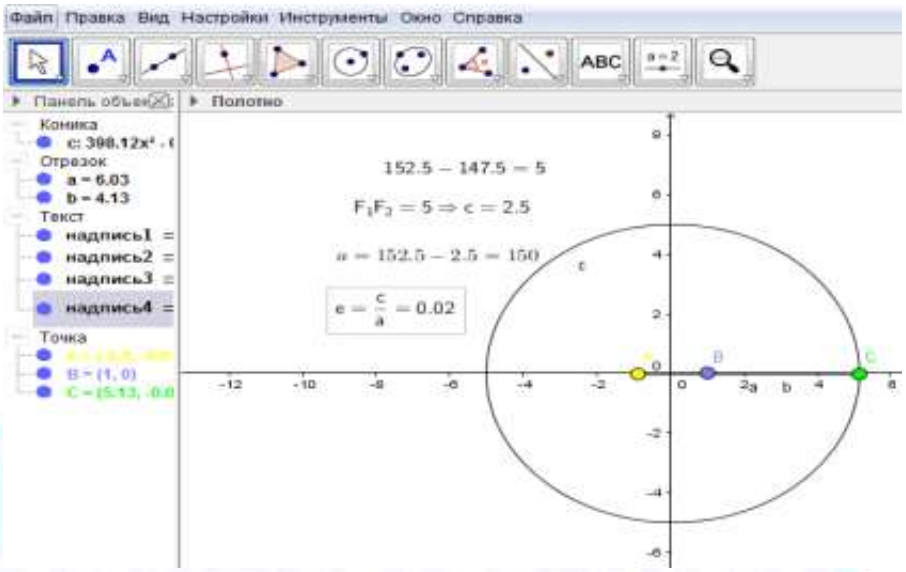
3-rasm

4-masala.Yer fokuslaridan birida Quyosh joylashgan ellips bo’ylab harakatlanadi. Yerdan Quyoshgacha eng yaqin masofa taqriban 147,5 million kilometr, eng uzog’i esa 152,5 million kilometrdir. Yer orbitasining katta yarim o’qi va ekssentrisitetini toping.

Bu masalani Geogebra dasturidan foydalanib yechamiz.

1) Geogebra dasturini faollashtiramiz, agar bu dastur o„rnatilmagan bo„lsa, Internetdan onlayne usulda ishlatish mumkin;

2) A va B nuqtalarni ellipsning fokuslari deb tanlab olib, ellipsda yotgan C nuqtada Yer, A nuqtada Quyosh joylashgan deb faraz qilsak, masala shartiga asosan AC=152,5 mln. km, BC = 147,5 mln.km, bundan $AB = AC - BC = 2c = 5$ *mln. Km.* kelib chiqadi. U holda $a = AC - c = 147,5 + 2,5 = 150$ *mln. km,* ellipsning ekssentrisiteti esa $e = c/a = 0,02$ (4-rasmga qarang) bo’ladi.



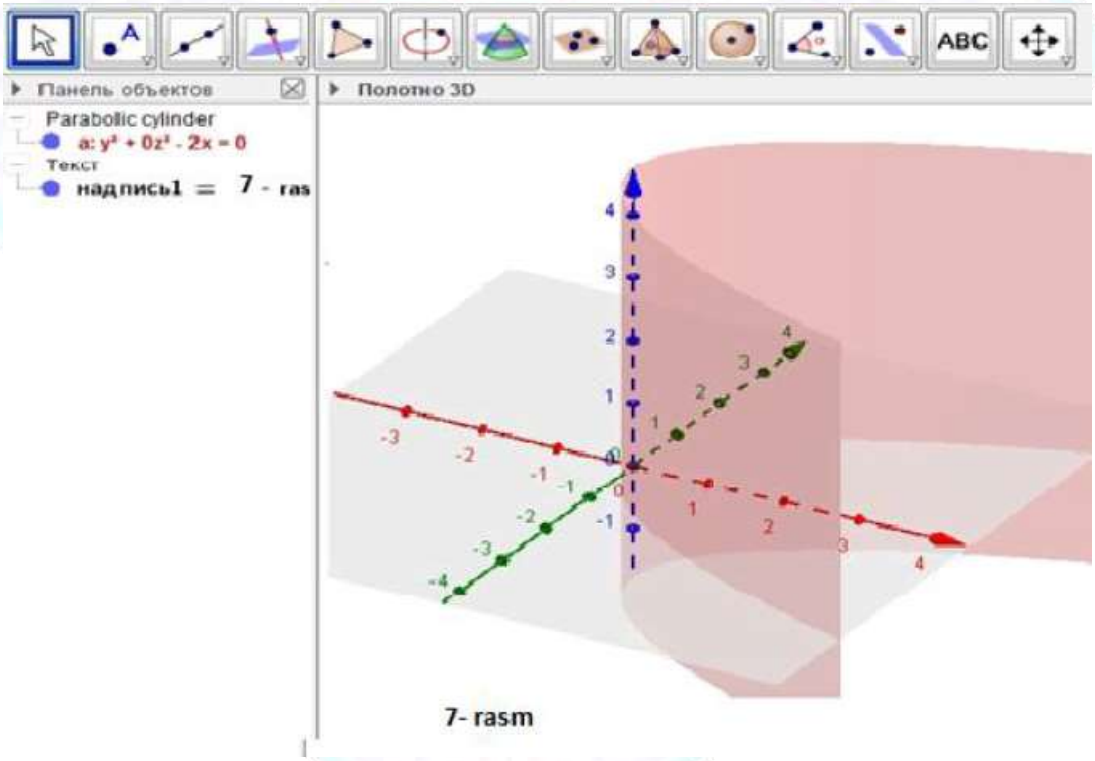
7-masala. tenglama bilan berilgan sirtni chizing.

Bu masalani yechishga ham Geogebra dasturini qo„llaymiz:

1) Geogebra dasturi bosh menyusida “Vid\Polotno 3D” ni tanlaymiz;

2) komandalar kiritish paneliga “y^2 = 2x” ni yozamiz;

3) “полотно 3D”da silindrik sirt hosil bo’ladi. Haqiqatan ham tenglamada z O’zgaruvchi qatnashmagani uchun sirt yasovchisi Oz o’qiga parallel bo’ladi (7–rasm).



7- rasm

8-masala. $y = \frac{4}{x^2}$, $z = 0$ chiziqning Oy o’qi atrofida aylanishidan hosil bo’lgan sirt tenglamasini toping va shaklini chizing.

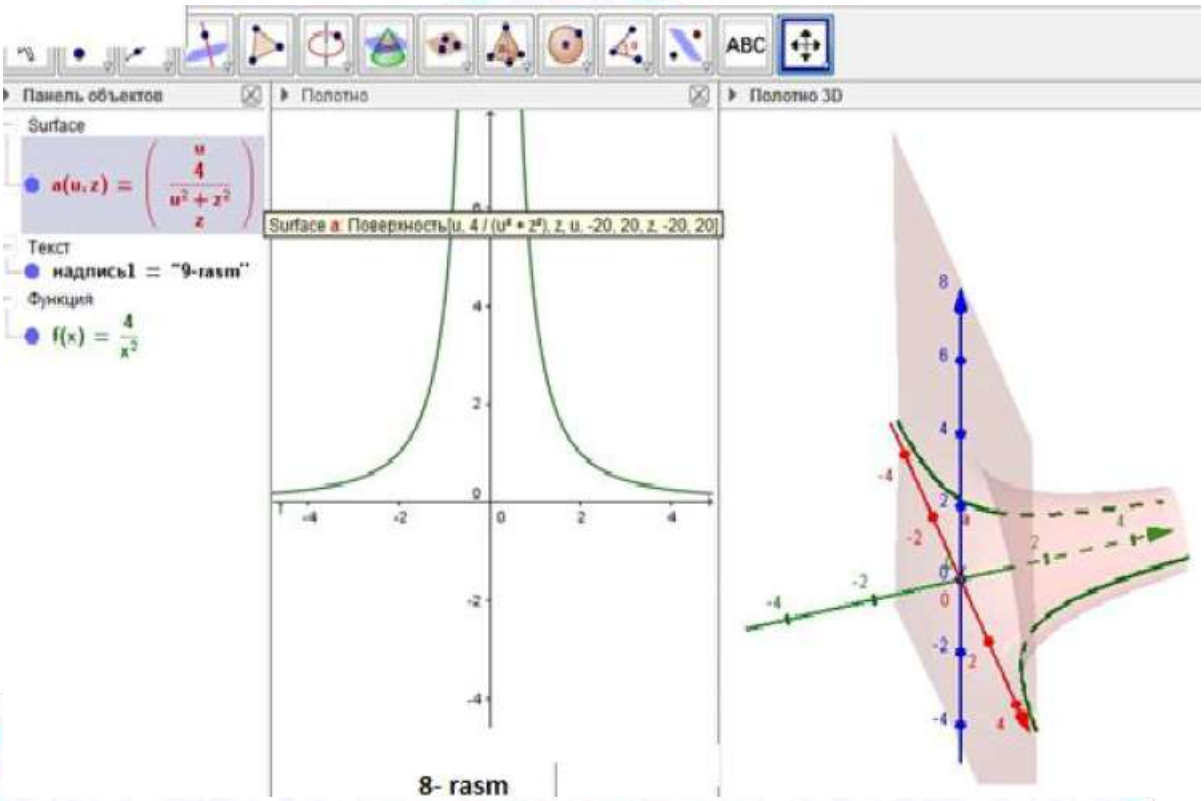
Yuqoridagi 8-masalada Geogebra dasturini tadbiq etamiz:

1) Geogebra bosh menyusida “Вид\Полотно 3D” ni tanlaymiz;

2) komandalar kiritish paneliga “y=4/ x^2” ni kiritamiz;

3) bu chiziqning Oy o,,qi atrofida aylanishidan hosil bo,,lgan sirt tenglamasini parametrik ko’rinishda yozamiz: “Поверхность[x,4/(x^2+z^2),z,x,–20,20,z,–20,20]”;

4) “Полотно 3D” da aylanma sirt hosil bo’ladi (8-rasm).



8- rasm

XULOSA

Xulosa qilib aytganda bugungi talaba mutaxassislikka oid masalalarini tez va sifatli yechishni hohlaydi. Qishloq xo’jaligi oliy o’quv yurtlarida matematika fanini o’qitishda axborot texnologiyalarini qo’llab o’qitish yaxshi samara beradi. Dunyo tajribasiga e’tibor beradigan bo’lsak nazariy ta’limdan amaliy ta’limga o’tish tendensiyasi shiddat bilan rivojlanayotganiga guvoh bo’lamiz. Shunday ekan, qishloq xo’jaligiga ixtisoslashgan oliy o’quv yurtlarida matematika fanlarini o’rgatishda amaliy mashg’ulotlar samaradorligini oshirishda axborot texnologiyalaridan foydalanishga katta e’tibor qaratish kerak bo’ladi. Matematika barcha mutahassisliklarni mukammal o’rganishning asosi ekanligiga talabalarda qiziqish uyg’otishda juda ham qo’l keladi.

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