

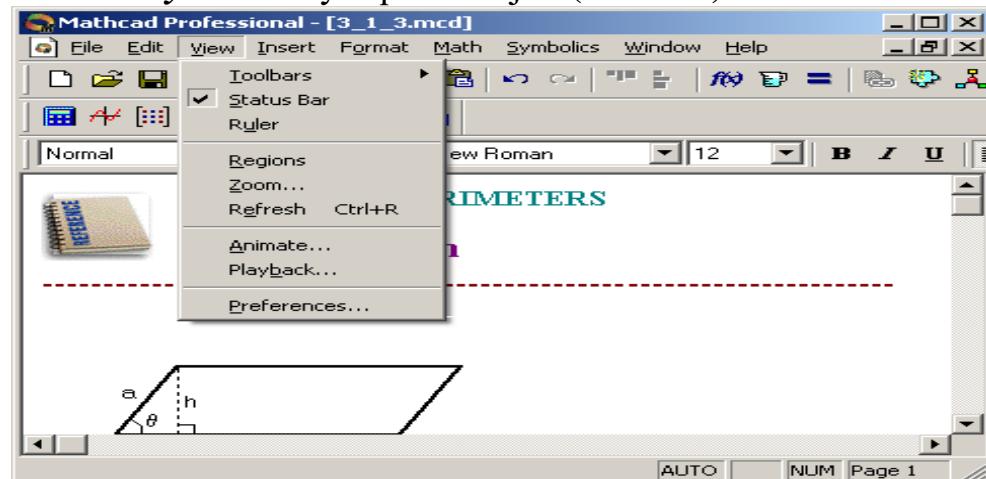
## 10-Amaliy mashg'ulot

Mavzu: Mutaxassisliklarga ixtisoslashgan tizimlar va dasturlar yordamida soha masalalarini yechish

**Mashg'ulotdan maqsad:** MathCAD tizimi menu satri

buyruqlar tizimidan iborat bo'lib, undagi File, Edit, Window, Help buyruqlari barcha Windows ilovalari uchun standart bo'lganligi sababli ularga to'xtalmasdan, uning asosiy menyularini qarab chiqamiz.

**View** menyusida Windows ilovalari uchun standart bo'lgan buyruqlar bilan birga animatsiyalar yaratish va ulardan foydalanish imkonini beruvchi "**Animate**" va "**Playback**" buyruqlari mavjud (**1 - rasm**).



1 – rasm. View menyusi buyruqlari ro'yxati.

Uning "**Preferences**" buyrug'i dasturni internetga ulash parametrlarini berish va to'g'ri yozishni sozlashga (faqat ingliz tilida) mo'ljallangan.

**Insert** menyusi hujjatga turli xil ob'yektlarni qo'yishni boshqarishga oid quyidagi buyruqlar guruhini o'z ichiga oladi (**2 - rasm**): **Graph** - 2 yoki 3 o'lchovli, qutb koordinatalar sistemasidagi grafiklarni joylashtirish; **Matrix** - hujjatga sonli massivni joylashtirish; **Function** - hujjatga funksiyalarini (masalan, sinus, kosinus va boshqalar) hamda MathCad ga xos funksiyalarini joylashtirish.

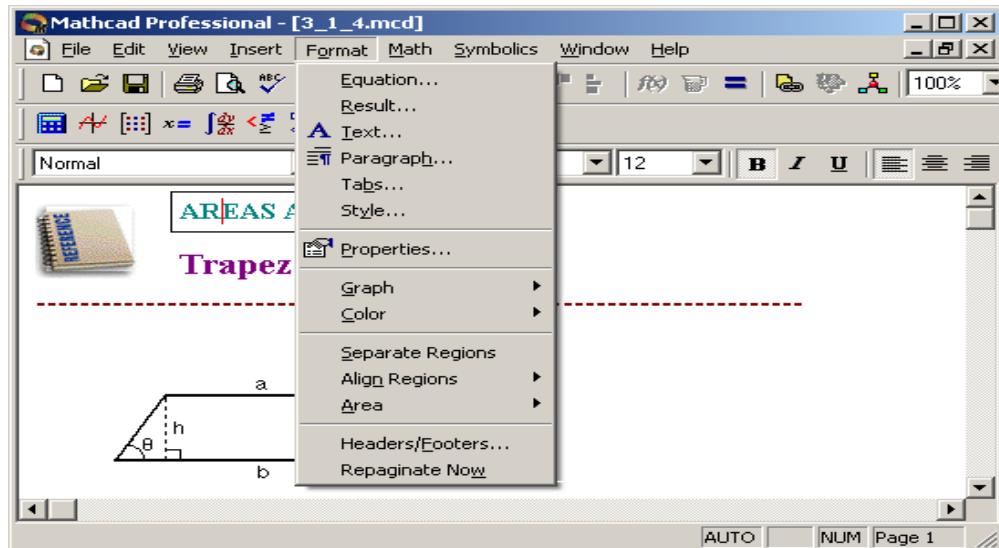


2 – rasm. Insert menyusi buyruqlari ro'yxati.

**Unit** - hujjatga o'lchov birliklarini kiritish; **Picture** - hujjatga rasmlar o'rnatish; **Math Region/Text Region** - oddiy matn yoki formulalarni kiritish; **Page Break** - hujjatda zarurat yuzasidan boshqa sahifaga o'tish; **Hyperlink** - hujjatga

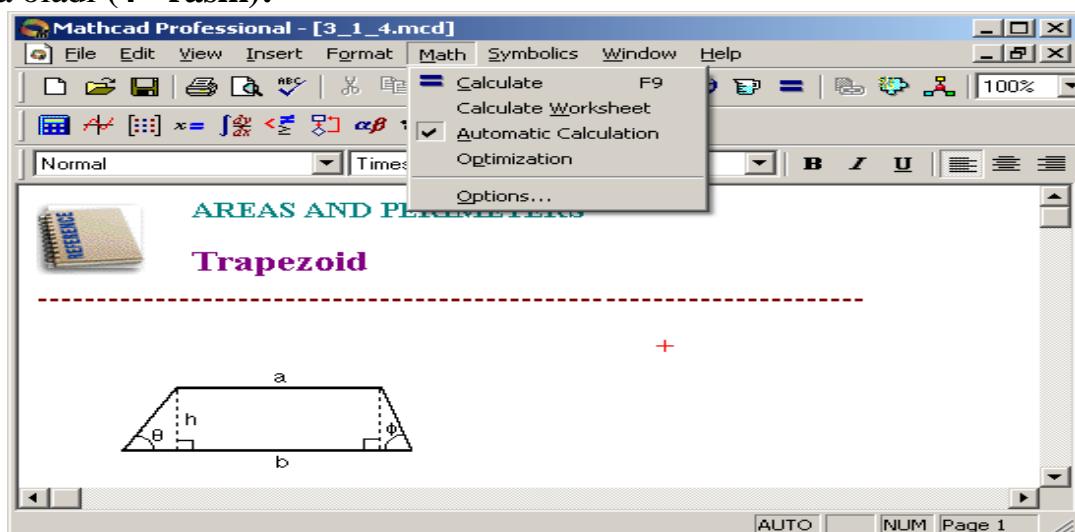
gipermurojaat qo'yish; **Reference** - hujjatdan boshqa faylga yo'l ko'rsatish; **Component** - hujjatga boshqa hisoblash dasturlarining (masalan, Excel yoki MatLab dagi) fayllarini qo'yish; **Object** - hujjatga boshqa formatdagi (masalan, Flash dagi) fayllarni qo'yish imkonini beradi.

**Headers/Footers** - sahifaning sarlovhasi va sarlovha ostisi; **Repaginate Now** - sahifani qayta yig'ish.



3 – rasm. Format menyusi buyruqlari ro'yxati.

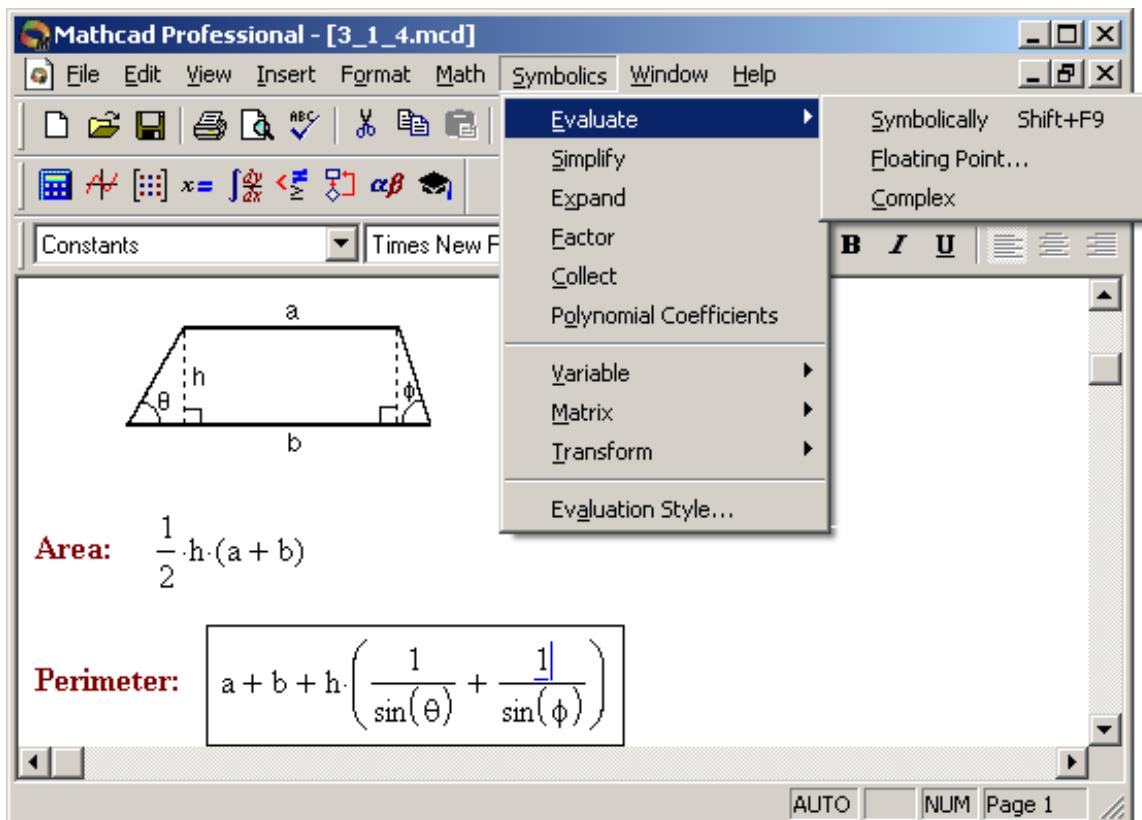
**Math** menyusi formulalarni hisoblashga oid quyidagi buyruqlar guruhini o'z ichiga oladi (**4 - rasm**):



4 – rasm. Math menyusi buyruqlari ro'yxati.

**Calculate** - ifodani hisoblash; **Calculate Worksheet** - sahifadagi hammasini hisoblash; **Automatic Calculation** - avtomatik tarzda hisoblash; **Options** - hisoblashning aniqligi.

**Symbolics** menyusi algebraik hisoblashlarga oid quyidagi buyruqlar guruhini o'z ichiga oladi (**5 - rasm**):



**5 – rasm.** Symbolics menyusি buyruqlari ro'yxatি.

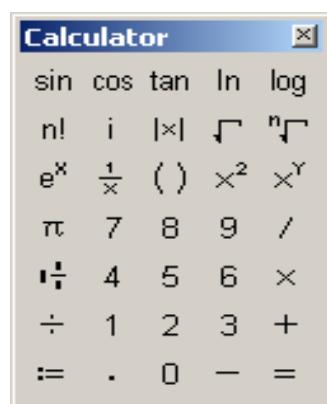
**Evaluate** - hisoblash; **Simplify** - ixchamlash (soddalashtirish); **Variable** - o'zgaruvchilar bilan ishlash; **Matrix** - matrisalar bilan ishlash.

## 2.2. Formulalarни киритиш

Formulalar – ishchi varaqning asosiy ob'yektlari (elementlari) hisoblanadi

Formula elementlarini kiritish uchun quyidagi panellardan foydalanish mumkin:

- sonlar, matematik belgilar va ko'p ishlatiladigan standart funksiyalarni kiritish uchun *Calculator* boshqarish paneli (**6 - rasm**);



**6 – rasm.** Calculator paneli.

- grafiklarni tuzish uchun *Graph* boshqarish paneli (**7 - rasm**);



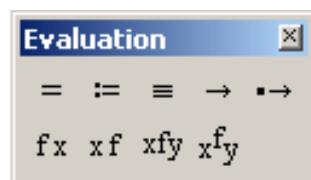
**7 – rasm. Graph paneli.**

- vektorlar va matritsalarni, matritsali amallar belgilarini kiritish uchun *Matrix* boshqarish paneli (**8 - rasm**);



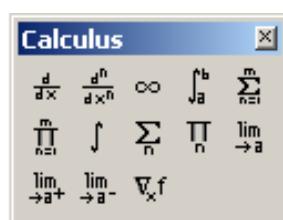
**8 – rasm. Matrix paneli.**

- hisoblash operatorlari va mantiqiy amallar belgilarini kiritish uchun *Evaluation* boshqarish paneli (**9 - rasm**);



**9 – rasm. Evaluation paneli.**

matematik tahliliga oid amallarni kiritish uchun *Calculus* boshqarish paneli (**10 - rasm**);



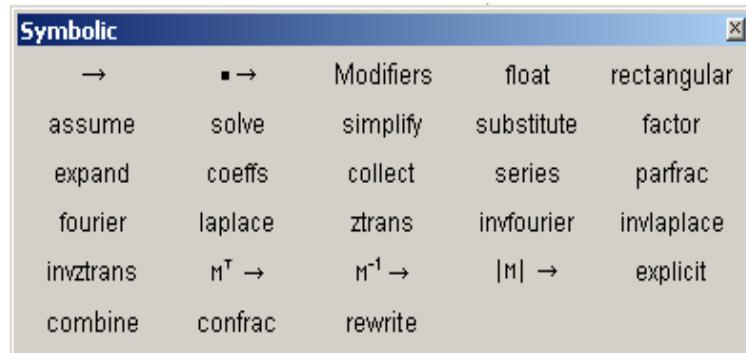
**10 – rasm. Calculus paneli.**

- grek alifbosidagi harflarni kiritish uchun *Greek* boshqarish paneli (grek harflarini klaviaturadan ham kiritish mumkin, agar mos lotin harfini kiritishdan so'ng tezda *CTRL+G* tugmalari birgalikda bosilsa, mos ravishda grek harfi hosil bo'ladi, masalan  $[a]/[CTRL+G] - \alpha$ ,  $[W]/[CTRL+G]-\Omega$ ) (**11 - rasm**);



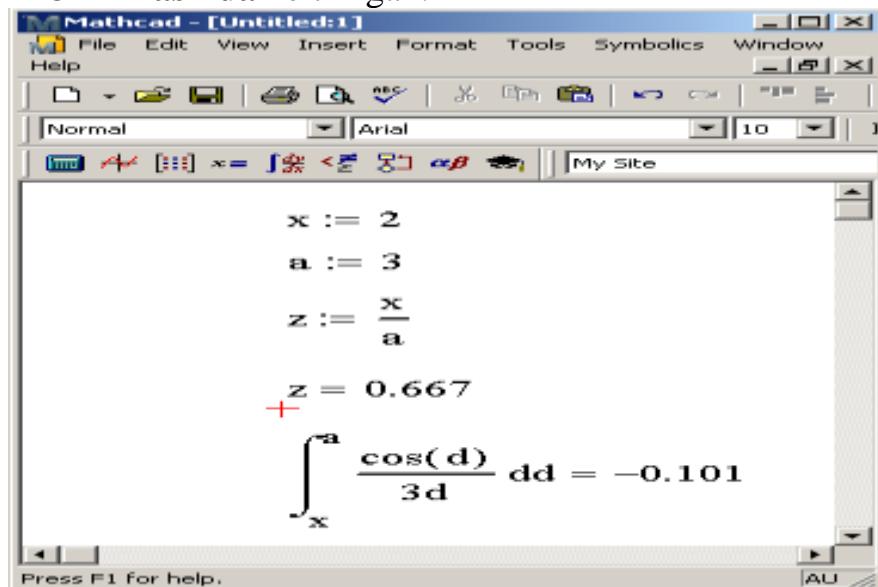
11 – rasm. Greek paneli.

- analitik shakl almashtirishlarni boshqarish uchun *Symbolic* boshqarish paneli (**12 - rasm**).



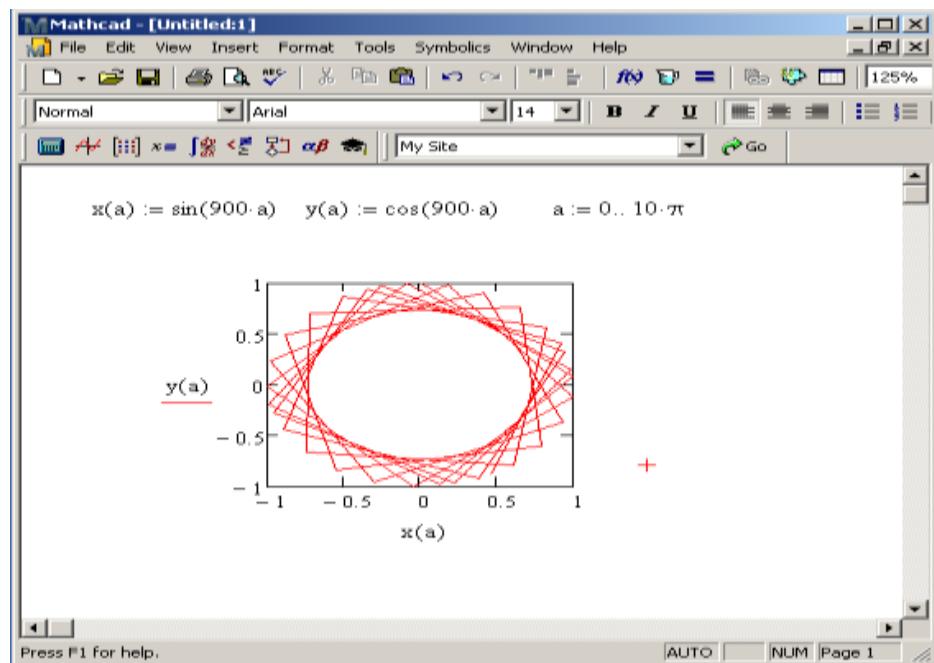
12 – rasm. Symbolic paneli.

Kiritilgan ifodalar odatda hisoblanadi yoki o’zgaruvchiga qiymat sifatida beriladi. Ifoda natijasini chiqarish uchun “=” belgisiga o’xshash va *Evaluation* uskunalar panelidagi *Evaluate Expression* tugmachasi yordamida kiritiladigan hisoblash belgisidan foydalaniladi. Formulalar kiritish namunalari **13 – rasmda** keltirilgan:

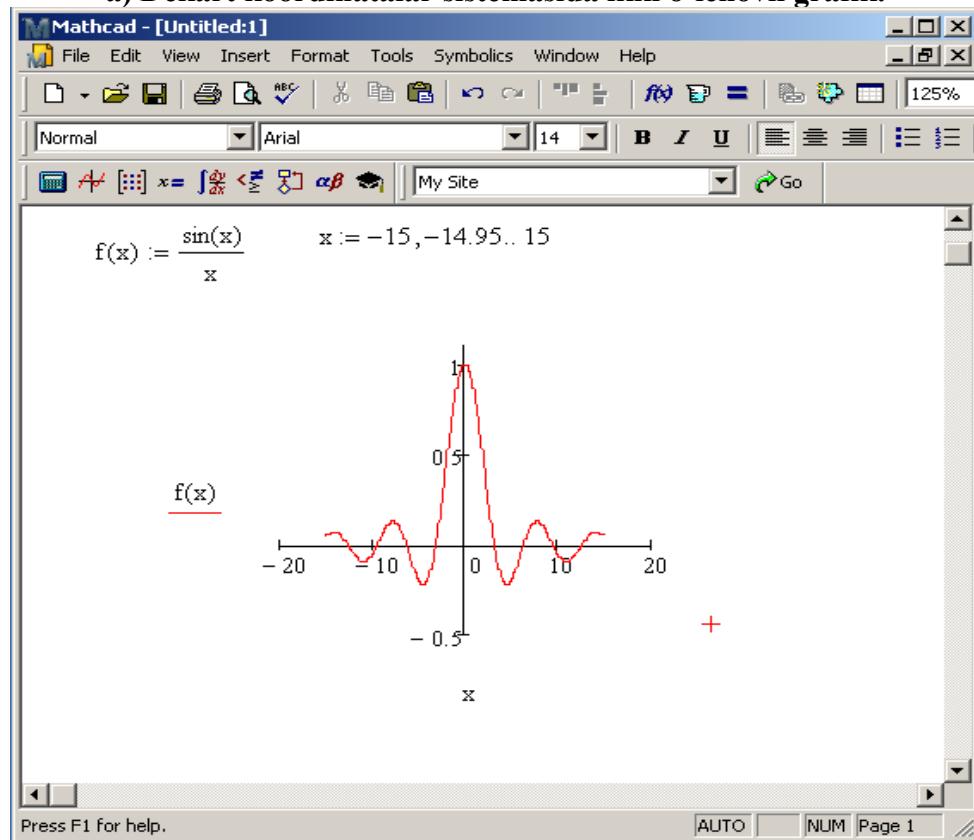


13 – rasm. MathCAD ga formulalarni kiritishga oid namunalar.

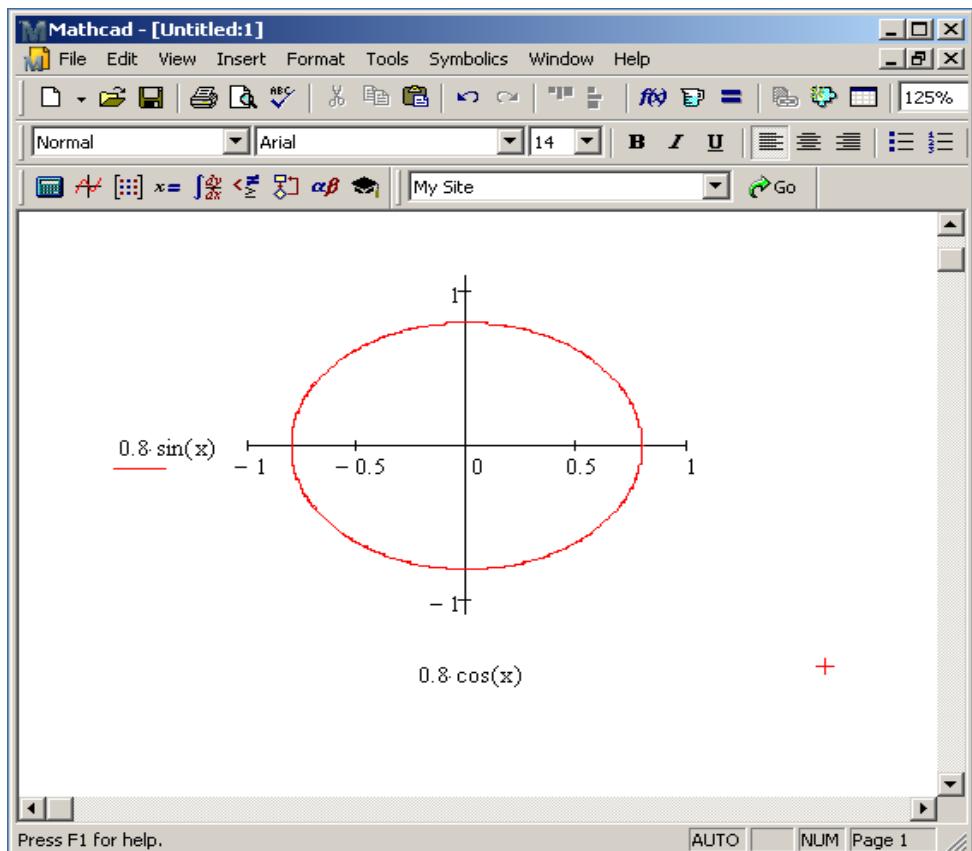
**14 – rasmda** Dekart va qutb koordinatalari sistemasida ikki va uch o’lchovli grafiklarni yasashga doir misollar keltirilgan.



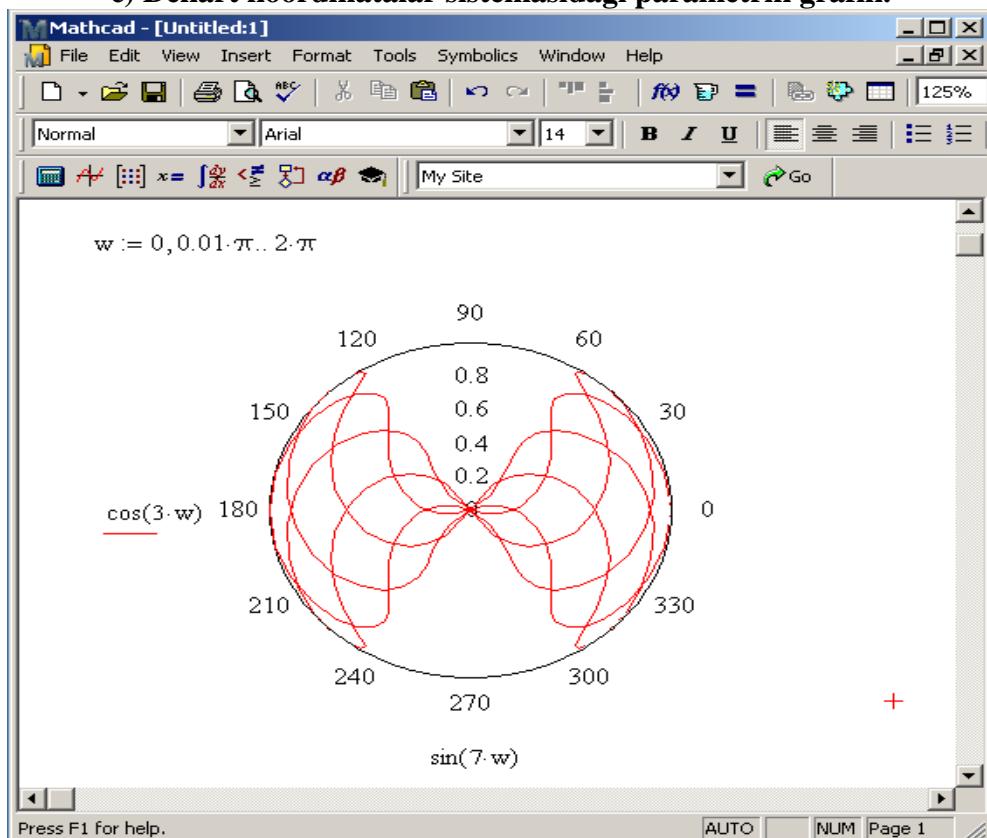
a) Dekart koordinatalar sistemasida ikki o'lchovli grafik.



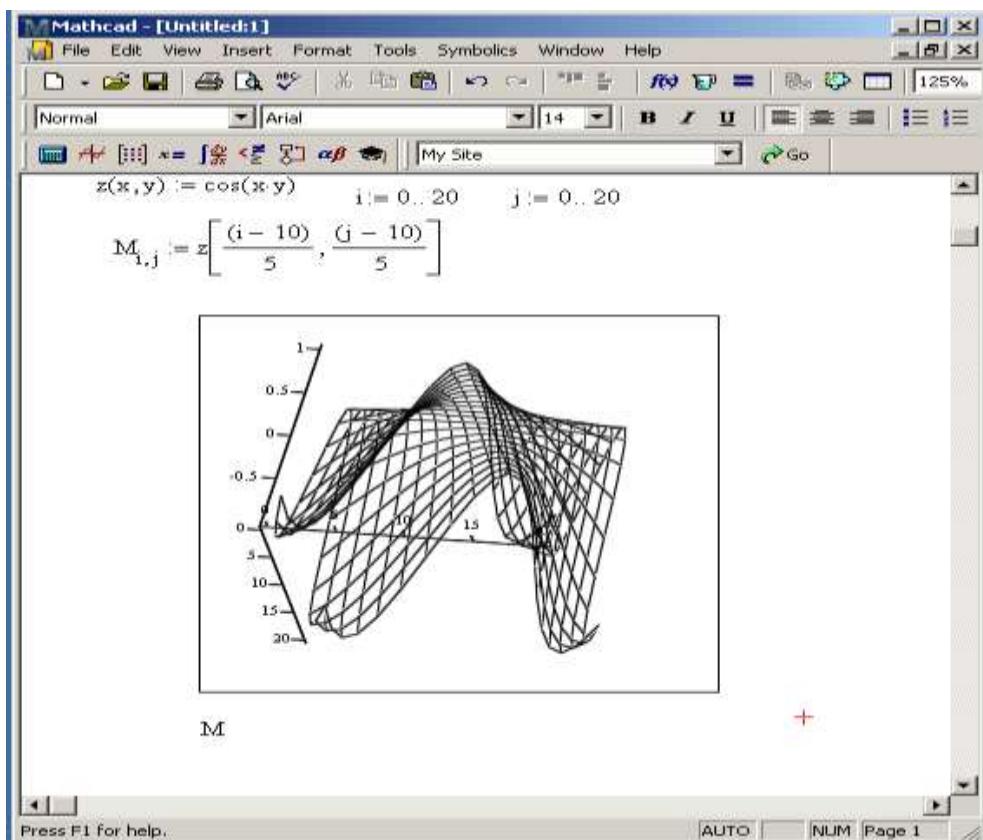
b) Trigonometrik funksiyaning ikki o'lchovli grafigi.



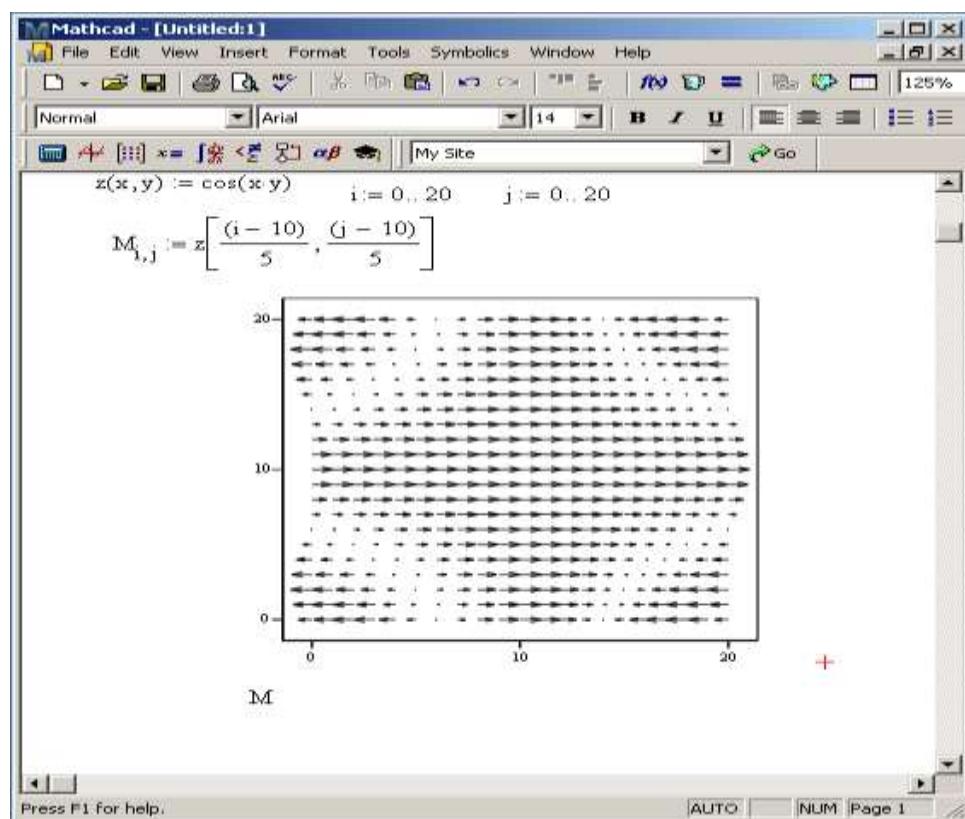
c) Dekart koordinatalar sistemasidagi parametrik grafik.



d) Qutb koordinatalari sistemasidagi grafik.



e) Uch o'lchovli sirt grafigi.



f) Uch o'lchovli sirtning vektorli grafigi.