

TARKIBIDA TUTASHMA ELEMENTLARI QATNASHGAN DETAL CHIZMASINI AUTOCAD DASTURIDA CHIZISH ALGORITMI

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Annotatsiya: Mazkur maqolada muhandislik va kompyuter grafikasi fanini o'qitishda AutoCAD dasturidan foydalanish asosida tutashmalarni qurish metodikasi yoritilgan. Xususan, detal chizmasini bosqichma-bosqich bajarish jarayoni, o'lchamlarni kiritish, geometrik elementlarni qurish hamda tutashmalarni hosil qilish usullari ilmiy-metodik jihatdan tahlil qilingan. Shuningdek, AutoCAD muhitida chizish jarayonini tashkil etish, buyruqlardan samarali foydalanish va an'anaviy grafik bilimlar bilan integratsiyalash imkoniyatlari asoslab berilgan. Tadqiqot natijalari AutoCAD dasturidan foydalanish talabalarning fazoviy tasavvurini rivojlantirish, grafik aniqlikni ta'minlash va kasbiy kompetensiyalarni shakllantirishda muhim ahamiyatga ega ekanligini ko'rsatadi.

Kalit so'zlar: AutoCAD, tutashma, muhandislik grafikasi, detal chizmasi, CAD tizimi, geometrik qurish, grafik metodika, texnik chizmachilik, radius, loyihalash

KIRISH

Bu grafik dastur orqali tutashma chizish ancha osonlashadi, faqat sizdan nazariy bilimlarni yaxshilab o'zlashtirib avvalambor qo'lda chizish ko'nikmangizni shakllantirib olishingiz talab qilinadi.

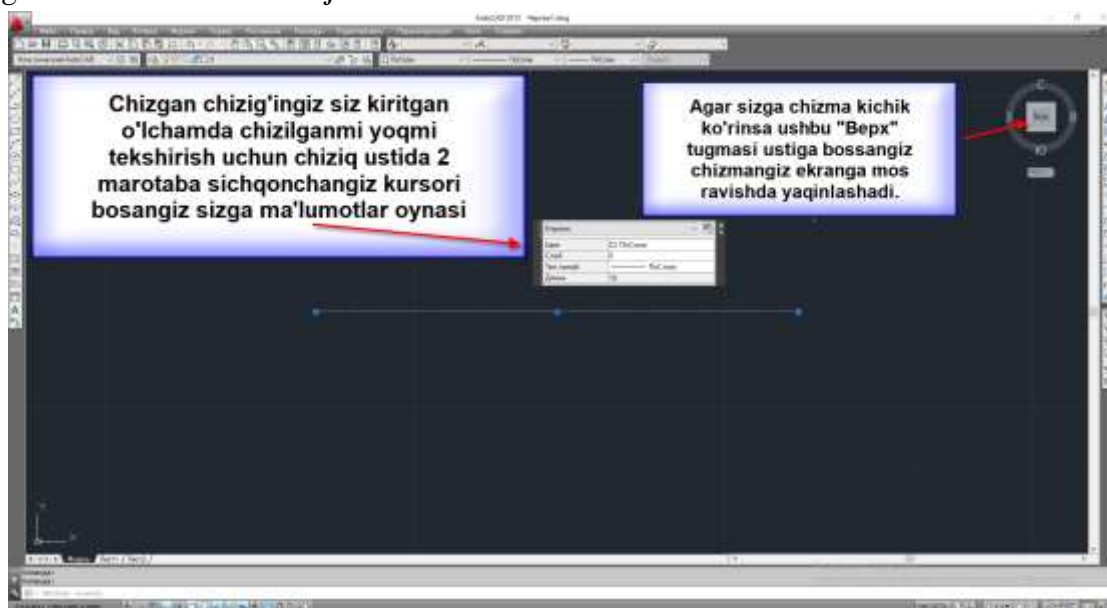
Agar o'zingizni tayyor deb hisoblasangiz hozir sizga AutoCAD grafik dasturi orqali murakkab bo'lmagan tarkibida tutashma elementlari qatnashgan detal ya'ni shaxmat donachasi chizmasini chizishni bosqichma-bosqich ko'rsatib beraman.

Buning uchun birinchi bo'lib biz sizga shaxmat donasi chizmasini taqdim etamiz.



1-varinat.

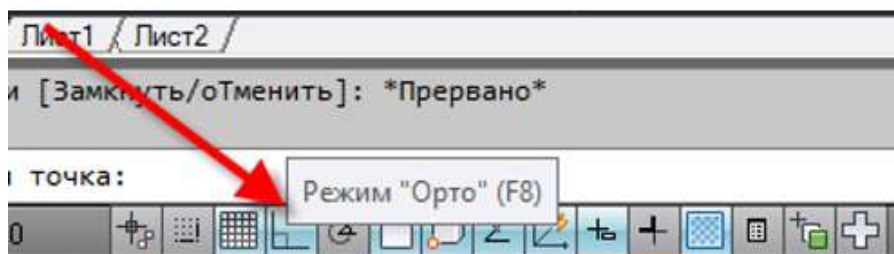
AutoCAD grafik dasturida dastlab ishni detalning pastki qismida berilgan o'lchamlarni tushinib olib, keyin chizishdan boshlaymiz. Birinchi bo'lib "Ø78" berilgan o'lchamni "Отрезок" buyrug'i orqali to'g'ri chiziq ko'rinishida chizib olamiz. Buning uchun "Отрезок" buyrug'iga bosib AutoCAD ishchi oynasiga chiqib olib istalgan biron joyga sichqonchani chap tugmasini bosamiz va o'ng tomonga qarab surib o'lchamni kiritamiz ya'ni klaviaturadan 78 raqami kiritamiz va "Enter" tugmasini bosamiz. Chizgan chiziq'imiz to'g'rimi yoqmi tekshirish uchun 1-rasmda berilgan ketma-ketlikni bajamiz.



1-rasm.

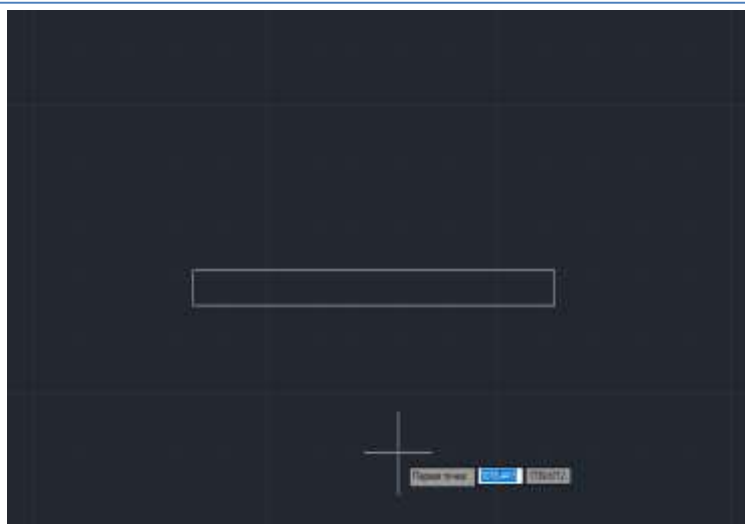
Yodingizda tuting har bir buyruqni bajarib bo'lgach agar uni davom ettirishni to'xtatmoqchi bo'lsangiz klaviaturadan "Esc" tugmasini bosasiz.

Chizmamizni davom ettiradigan bo'lsak, pastdagi o'lchamlarni ham berilganidan qilib chizib olamiz. Ya'ni 78 mm chiziq'imiz tugagan joydan tepaga 90° burchak ostida 6 mm lik o'lchamni kiritamiz. Agar sizda chizmani hamma tomonga o'zaro chiziqni sinmasdan 90° gradus burchak ostida chizishini hohlasangiz klaviaturadan "F8" tugmasini bosing, shunda sizda faqat sinmasdan chiziqlar chiziladi (ushbu tugma ko'pincha standard klaviaturalarda bo'ladi).

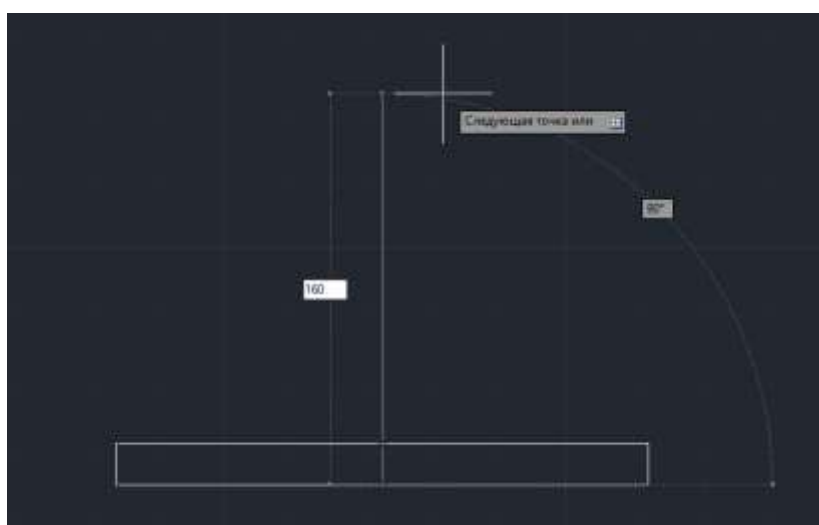


Ushbu tugma sizning klaviaturangizda bo'lmasa ishchi oynaning pastida joylashgan ushbu tugmaga bosish orqali ham sozlasangiz bo'ladi. Yonidagi qolgan tugmachalar haqida ham o'quv qo'llanma davomida tushintirishlar berib boramiz.

O'lchamlar bo'yicha ishni davom etamiz. 2-rasmdagi holatga keltirib olamiz va "Esc" tugmasini bosamiz.

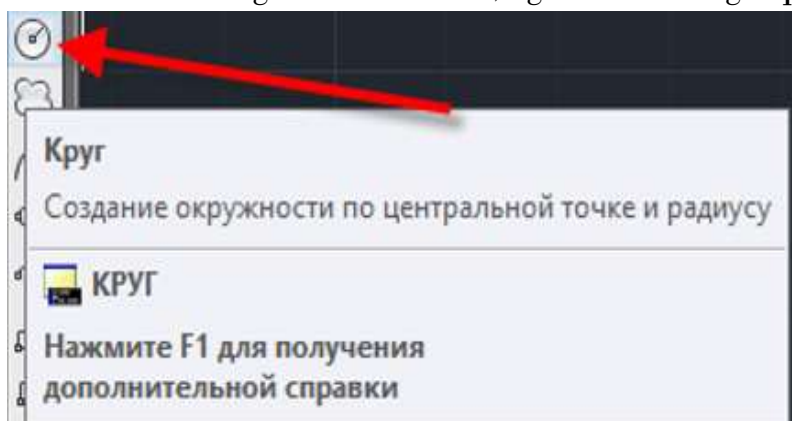


2-rasm.

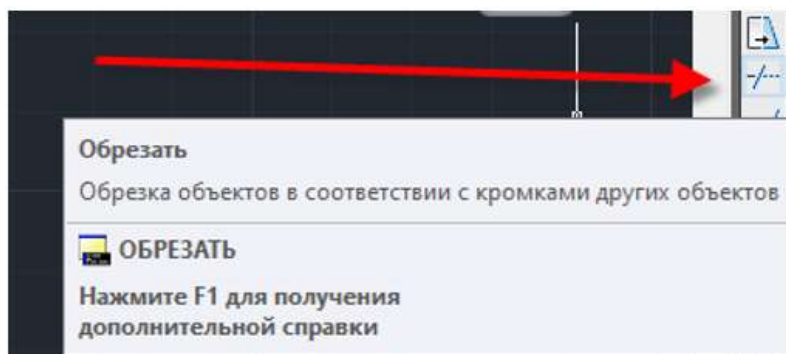


3-rasm.

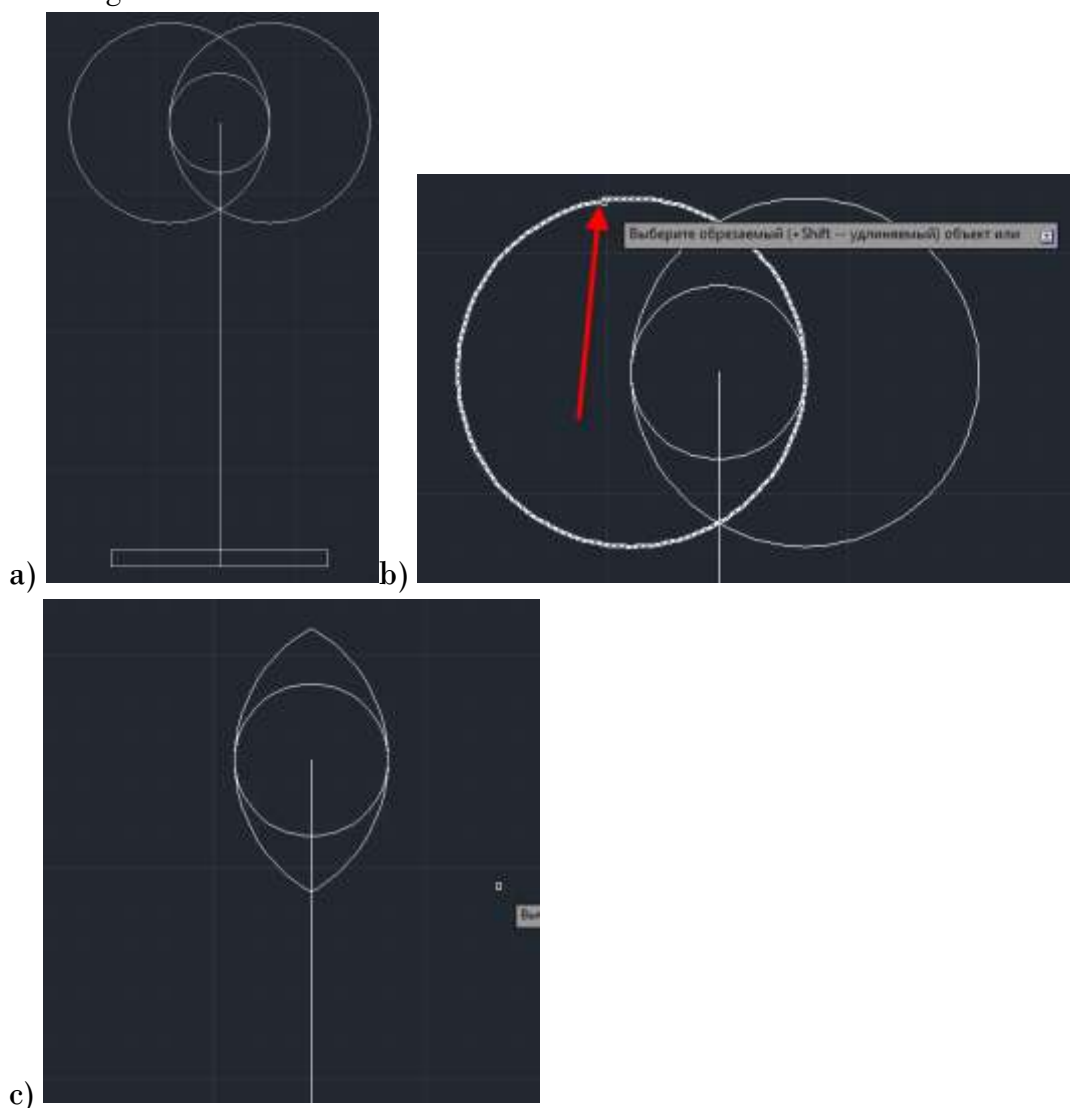
3-rasmdagidek chiziqning markazidan tepagan qarab 90° burchak ostida 160 mm o'lcham kiritib olamiz va "Enter" tugmasini bosamiz. Har safar o'lcham kirganimiz "Enter" tugmasini bosamiz, agar bosmasangiz qiymatni qabul qilmaydi.



Qolgan joylarini ham 1-variantdagi kabi chizib olamiz. Aylana ko'rinishida berilgan joylarini radiusi bo'yicha ushbu buyruqdan foydalangan holda chizib olamiz va 18-rasm A da berilgan holga keltirib olamiz. Bizga kerakmas ortiqcha joylarni ushbu buyruq orqali o'chiramiz.



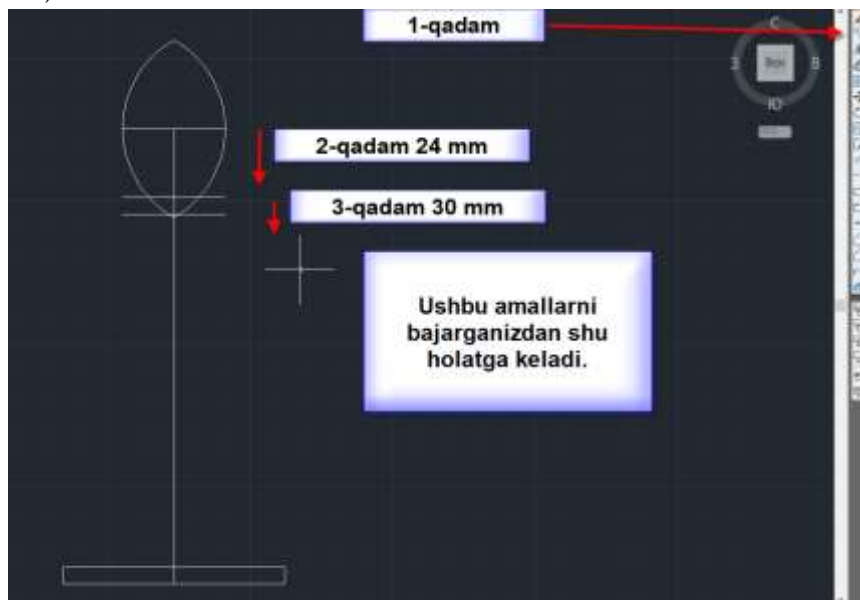
Bu buyruqni ishlatish uchun, buyruq ustida kursorni bosib “Enter” tugmasini 2 martoba bosamiz va shunda qaychi buyrug‘ini ish holatiga keltirgan bo‘lamiz. Bu amalni bajargandan so‘ng 4-rasm, B dagi kabi chiziq ustiga bossangiz chiziq kesishgan joyidan keyingi kesishgan joygacha o‘chadi. Holat 4-rasm C dagidek bo‘ladi.



4-rasm.

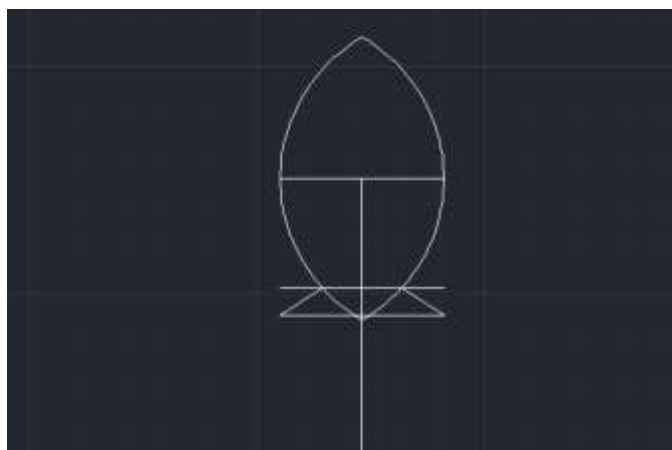
O‘rtadagi aylananing ustida kursorni bosib klaviaturadan “Delete” tugmasini bosish orqali o‘chirib tashlaymiz. O‘chirib tashlagan aylanamizning markazidan ikki

cheklagacha yetadigan chiziq chizib olamiz. Va u chiziqning ustiga bosib “Копироват” tugmasini bosib chiziq pasga qarab tushirib navbatdagi o'lchamlarni 24 mm va 6 mm kiritamiz. Birinchi bo'lib 24 mm kiritib, keyin davom ettirish uchun $24+6=30$ ligini inobatga olib 30 mm o'lcham kiritamiz va “Enter” tugmasini bosamiz (5-rasm).

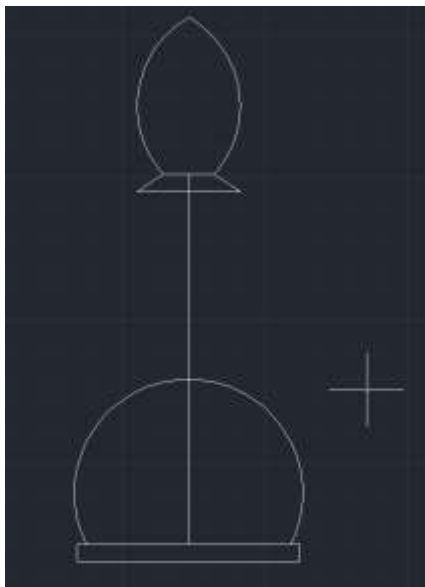


5-rasm.

Shaxmat donasining bel qismidagi $\varnothing 80$ o'lchamli aylanani chizib olish uchun avval pastdagi chiziqni nusxalab olib tepaga 18 mm ko'tarib olamiz va markazdagi chizi bilan kesishgan joyidan $\varnothing 80$ bo'lgan ya'ni 40 radiusli aylana chizib olamiz. Yuqorida aytganimizdek AutoCAD grafik dasturi faqat mm o'lchov birligida chizadi. Aylanani ham shuning uchun diametrda berilgan bo'lsa ham uning radiusini hisobga olib chizishimiz kerak.

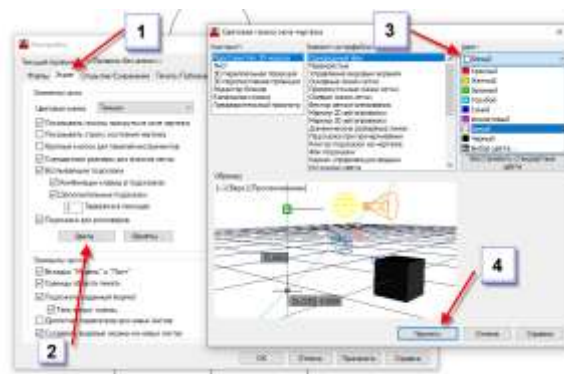
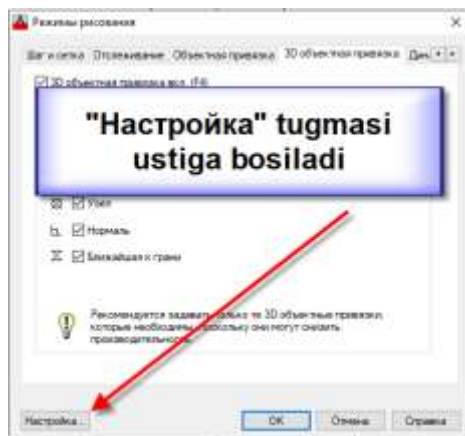
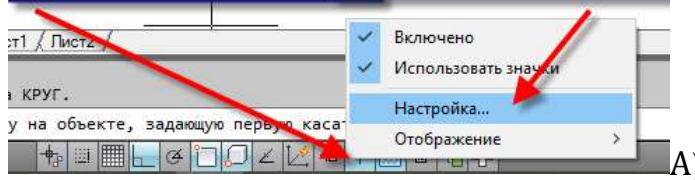
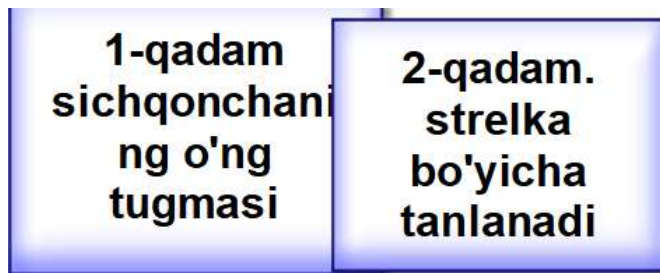


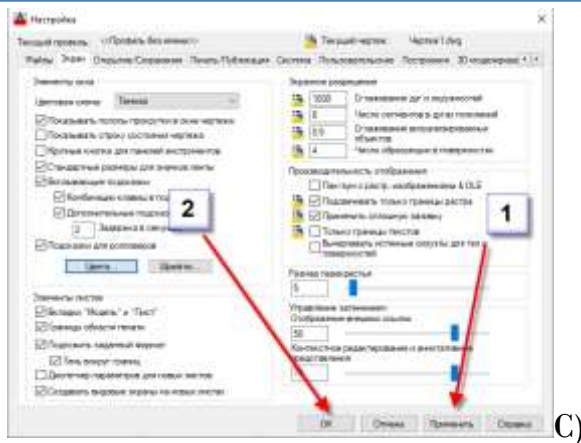
shaxmat donasining bosh qismidagi chiziqlarni shu tartibda tutashtirib olamiz va tepadagi ortiqcha chiqib turgan joyini “Обрезать” yordamida kesib tashlaymiz. “Обрезать” yordamida qolgan ortiqcha chiziqlarni ham o'chirib tashlaymiz (6-rasm).



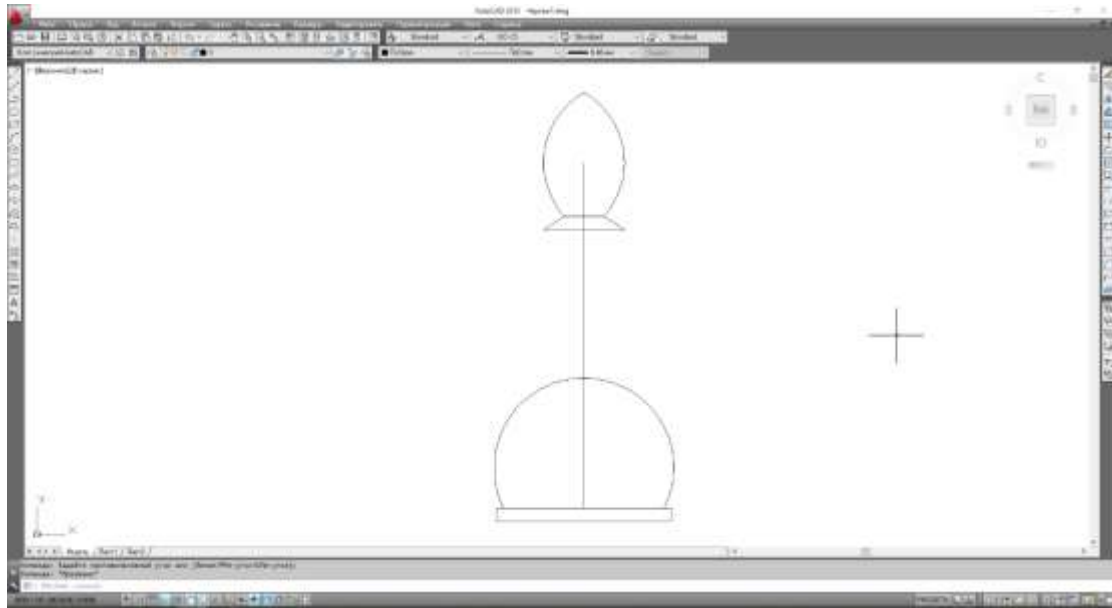
6-rasm.

Agar sizga AutoCAD ishchi oynasining qora foni yoqmayotgan bo'lsa uni oq yoki rang tanlab fonga o'zgartirish kiritish mumkin. Buning uchun quyidagi 7-rasmdagi A,B,D,C,F ketma ketlik bajarilishi kerak.





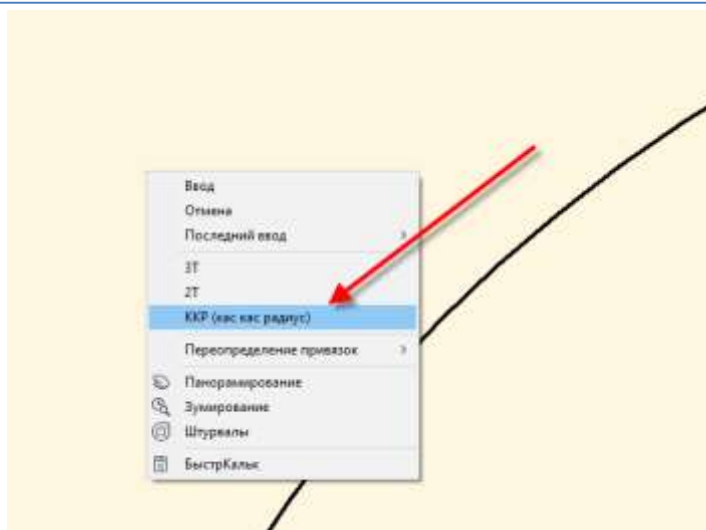
C)



F)

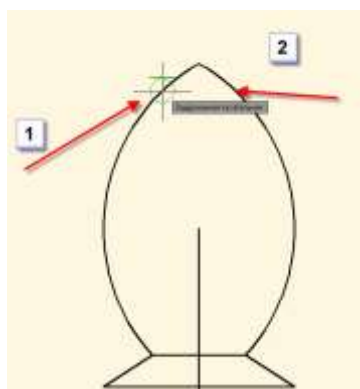
7-rasm.

E'tiboringizni variantga qaratishingizni so'ragan bo'lardim, sababi u yerda jami 3 ta qismda tutashma mavjud. Bular bosh qismida va yoqa qismi bilan bel qismini tutashiradigan joylarga to'g'ri keladi. Bularni tutashirish biz huddi qo'l chizmasini chizishda foydalanadigan usuldan foydalansak ham bo'ladi, lekin biz sizga undan ham oson usulni o'rgatamiz. Buning uchun tutashma urinadigan nuqtalar aniq bo'lishi lozim. Birinchi bo'lib tutashmani bosh qismidagi R6 bo'lgan ya'ni uchini silliqlash uchun kerak tutashmani bajaramiz. Buning uchun "Kpyr" buyrug'i tanlanadi va ishchi oynaga chiqib sichqonchanning o'ng tugmasi bosiladi va 8-rasmdagi menyuda ochiladi.

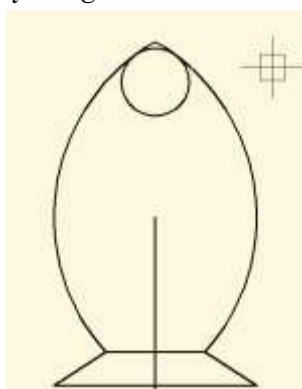


8-rasm.

Ushbu buyruqni tanlaganizdan keyin shaxmat donasining bosh qismidagi tutashma mavjud joyiga borasiz va tahminiy urinish nuqtalarini sichqonchanning o'ng tugmasini bosish orqali belgilab chiqasiz (9-rasm). So'ngra R6 ni kiritasiz va "Enter" tugmasini bosasiz va 10-rasmdagi holat yuzaga keladi.

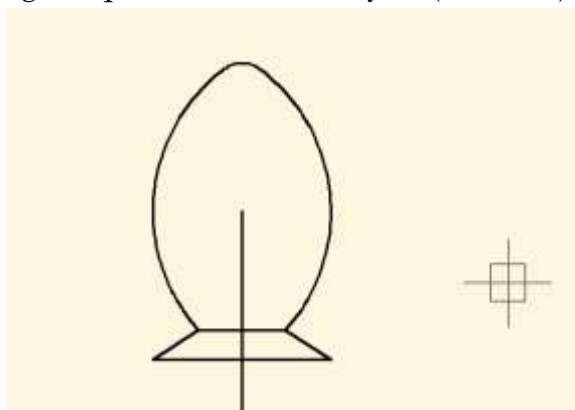


9-rasm.



10-rasm

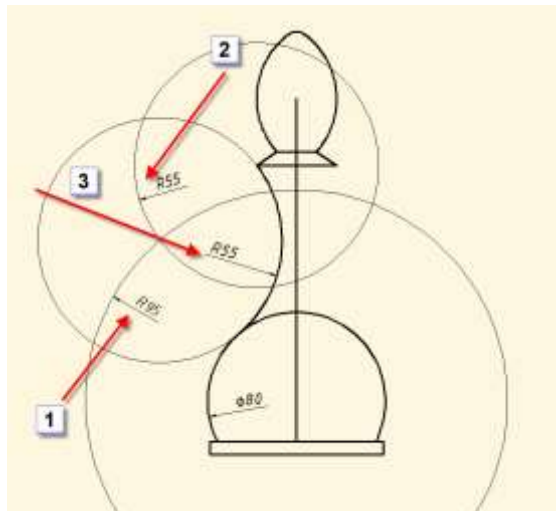
24-rasmdagi aylana paydo bo'lgandan keyin uni keraksiz joylarini "Обрезать" buyrug'i orqali o'chirib tashlaysiz (11-rasm).



11-rasm.

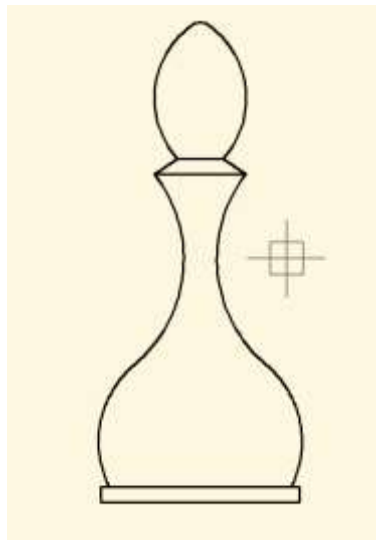
Endi asosiy qismiga keldik, bu yerda KKP buyrug'i yordam bermaydi sababi bu buyrug' faqat aylanalarga nisbatan amal qiladi. Bu yerdagi holat esa kesmaning uchi (nuqta) bilan aylananing ishtirokida tutashma hosil bo'layapti. Shu sababli tutashma qonun qoidalari bo'yicha ishlaymiz. Diqqat bilan e'tibor bersangiz bu yerda tashqi tutashma mavjud. Siz bilasizki tashqi tutashmada radiuslar qo'shiladi. Ya'ni $R+R_1$,

keyingi nuqtamizda hech qanday o'lcham yo'qligi sababli u yerda tutatash radiusini o'zi kiritamiz ($R55$ ni). $R40+R55=R95$ bo'lishini inobatga olib, huddi shu $R95$ radiusli aylanani $\varnothing 80$ aylananing markazidan chizamiz va tepadagi urinish nuqtasiga esa $R55$ ni o'zini chizib olamiz. Natijada ikkala aylanalarimiz kesishadi, kesishgan joyidan $R55$ tutashtirish aylanasi chizib olamiz (12-rasm).



12-rasm.

Huddi shu 12-rasmda chap tomonda bajarilgan ishlarni o'ng tomonda ham amalga oshirish kerak. Keyin yana o'sha "Обрезать" buyrug'i orqali ortiqcha keraksiz joylarini kesib tashlaymiz va 13-rasmdagi holatga keltirib olamiz.



13-rasm.

Shuning bilan tutashmamiz tayyor bo'ladi, (13-rasm) faqat o'lchamlarini belgilangan tartibda yuqorida o'rgatganimizdek qilib o'lchamlarni sozlab chiqib, undan keyin qo'yib chiqsangiz bo'ldi.

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