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N. G'ulomova

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# OG'MA QIRQIM VA KESIM



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Toshkent - 2012

**O'ZBEKISTON RESPUBLIKASI  
OLIV VA O'RTA MAXSUS TA'LIM VAZIRLIGI**

**NIZOMIY NOMIDAGI TOSHKENT DAVLAT  
PEDAGOGIKA UNIVERSITETI**

# **OG'MA QIRQIM VA KESIM**

Toshkent - 2012

### **Annotatsiya**

Chizmachilik fanining “Og‘ma qirqim va kesim” mavzusiga bag‘ishlangan mazkur qo‘llanma “Chizmachilik” fani o‘qitiladigan barcha oliy o‘quv yurtlari talabalari hamda yosh o‘qituvchilar uchun mo‘ljallangan. Unda og‘ma qirqim chiziqlarini qurish, qirqim natijasida hosil bo‘lgan kesim yuzalarining xaqiqiy kattaliklarini aniqlash yo‘llari yoritib berilgan.

Bundan tashqari qo‘llanmada mustaqil ravishda grafik ishlar bajarish orqali olingan bilimlarni mustahkamlash, kengaytirish va chuqurlashtirish uchun talabalarning bilim darajasiga mos keladigan qilib turli murakkablikdagi tarqatma material variantlari muallif tomonidan tuzib keltirilgan.

Mas‘ul muharrir: A. Abdurahmonov, TDPU dotsenti

Muallif: N. G‘ulomova, “Chizmachilik va uni o‘qitish metodikasi” kafedrası o‘qituvchisi

Taqrizchilar: A.O.Ashirboyev, TDPU dotsenti  
I.Ma‘murov, TTYMI “Informatika, chizma geometriya va muhandislik grafikasi” kafedrası dotsenti, t.f.n.

Uslubiy qo‘llanma Nizomiy nomidagi TDPU o‘quv-uslubiy kengashining 2012 yil 10 maydagi 10 -sonli yig‘ilish qarori bilan nashrga tavsiya etilgan.

### Og'ma qirqim va kesim

**Qirqimlar xaqida umumiy tushuncha.** Buyumning ichki ko'rinishini tasavvur qilish uchun chizmalarda ko'rinmas kontur chiziqlari qo'llaniladi. Bu esa chizmalarni o'qishni qiyinlashtirib xatoliklarga olib kelishi mumkin. Shartli tasvirlar bo'lgan qirqimlarni qo'llash, chizmalarni o'qishni va chizishni oson hamda sodda qiladi. Qirqim deb buyumni fikran bir yoki bir nechta tekislik bilan kesilishidan hosil bo'lgan tasvirga aytiladi. Bunda buyumning kuzatuvchi bilan kesuvchi tekislik orasidagi qismi fikran olib tashlanadi va proyeksiya tekisligida kesuvchi tekislikda hosil bo'lgan shakl hamda uning orqasidagi ko'rinadigan qismlar tasvirlanadi.

Kesuvchi tekislikning gorizontalar proyeksiyalar tekisligiga nisbatan vaziyatiga qarab qirqimlar gorizontalar, vertikal va og'ma qirqimlarga bo'linadi.

Agar kesuvchi tekisliklar buyumning uzunligi va balandligi bo'yicha yo'nalgan bo'lsa bunday qirqimlar bo'ylama qirqimlar, agar uzunligi va balandligiga perpendikulyar yo'nalgan bo'lsa ko'ndalang qirqimlar deyiladi.

Kesuvchi tekisliklarning soniga qarab qirqimlar oddiy (agar kesuvchi tekislik bitta bo'lsa) va murakkab (agar kesuvchi tekisliklar bir nechta bo'lsa) qirqimlarga bo'linadi.

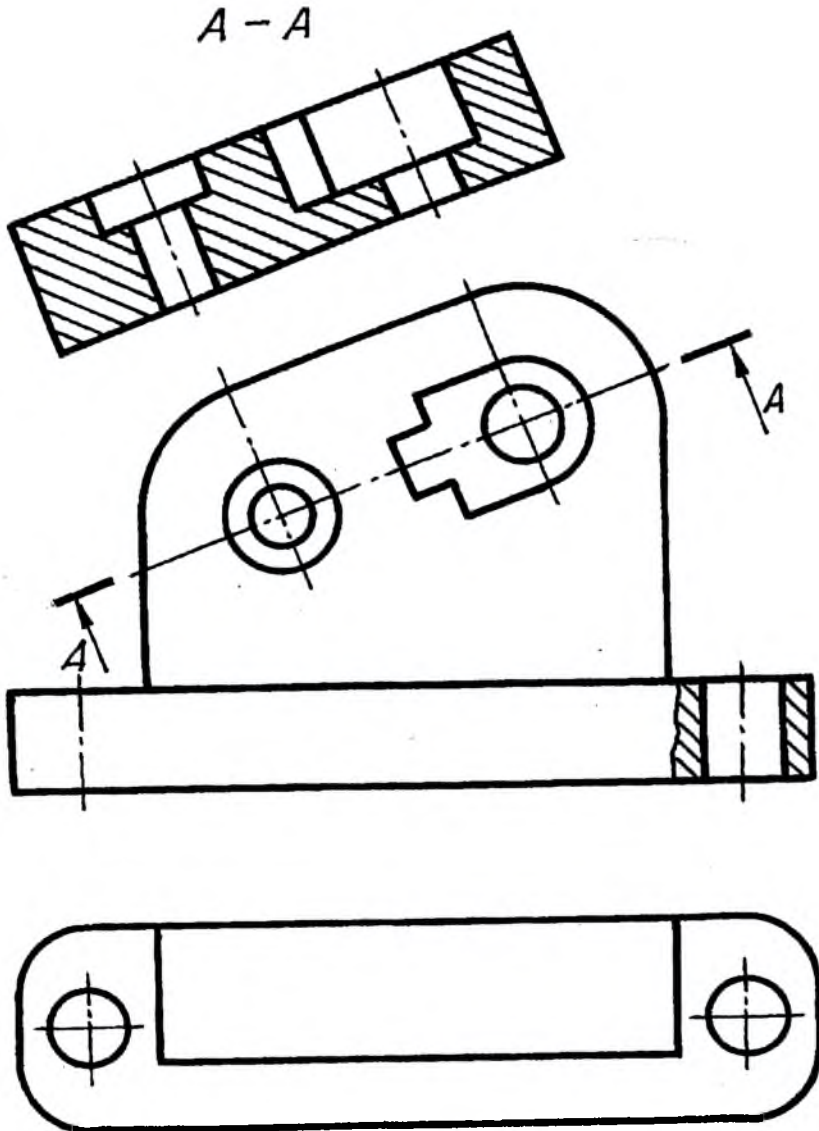
Qirqim bajarilishi natijasida shtrix chiziqlar bilan tasvirlangan ko'rinmas ichki kontur chiziqlar ko'rinadigan bo'lib qoladi va ular asosiy yo'g'on tutash chiziqlar bilan tasvirlanadi.

Buyumni fikran kesish faqat aynan qirqim bajarilgan tasvirga ta'luqli bo'lib, buyumning boshqa tasvirlariga o'zgartirishlar kiritilmaydi.

Quyidagi keltiriladigan barcha misollarda, shartli ravishda, buyumlar metall deb qabul qilinadi va materiallarni kesimda grafik belgilashda gorizontalar chiziqqa nisbatan  $45^\circ$  burchak ostida joylashgan ingichka tutash chiziqlar bilan shtrixlash orqali ko'rsatiladi. Shtrix chiziqlari detalning barcha qirqim bajarilgan tasvirlarida bir tomonga chap yoki o'ng tomonga yo'nalgan bo'ladi.

### Og'ma qirqim

Og'ma qirqim deb gorizontalar proyeksiyalar tekisligi bilan o'tkir (o'tmas) burchak ostida joylashgan kesuvchi tekisliklar orqali hosil

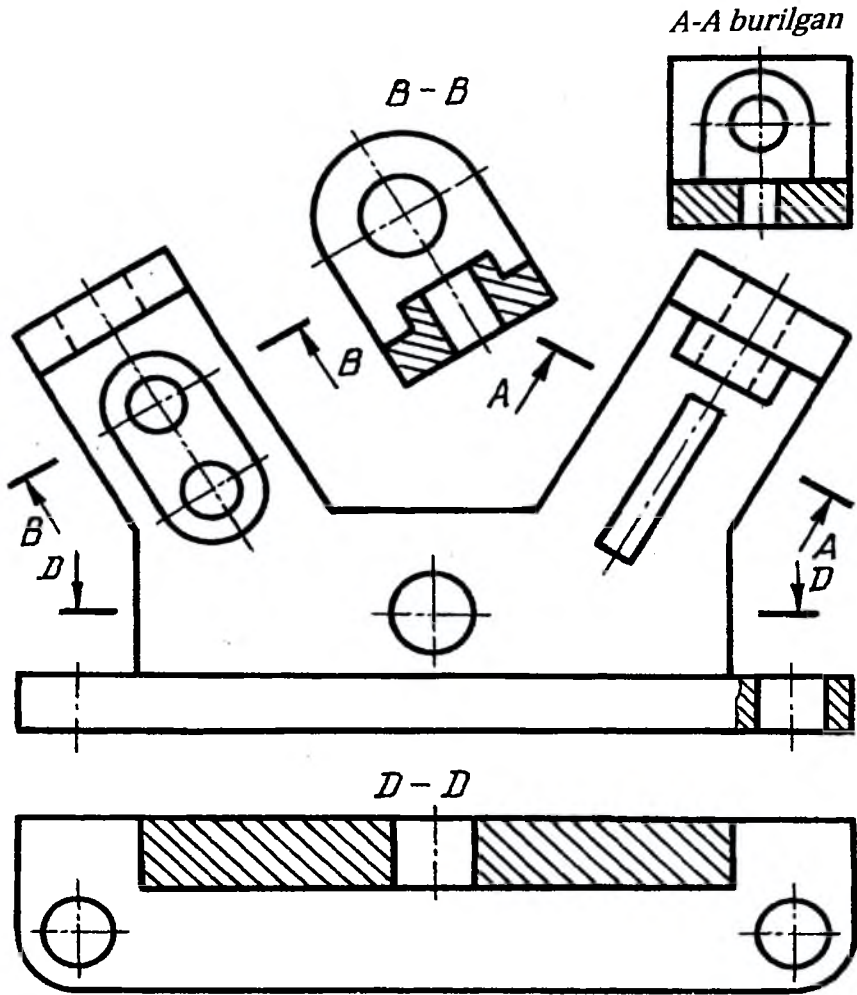


qilinadigan qirqimga aytiladi.

1-shakl

1-shaklda og'ma qirqimga misol keltirilgan. Kesuvchi tekislikning vaziyati qarash yo'nalishini ko'rsatuvchi strelkalar qo'yilgan shtrix chiziqlar bilan belgilanadi.

Og'ma qirqimlar qarash yo'nalishiga mos ravishda joylashtiriladi (1-shakl). Zarur bo'lganda og'ma qirqimni ko'rinish bilan proyeksion bog'lanmagan holda, lekin strelkalar bilan ko'rsatilgan qarash yo'nalishini hisobga olib, chizma qog'ozining hohlagan yeriga joylashtirish mumkin (2-shakl, B - B qirqim). Og'ma qirqimni burib ham tasvirlash mumkin (2-shakl, A-A qirqim), lekin B-B



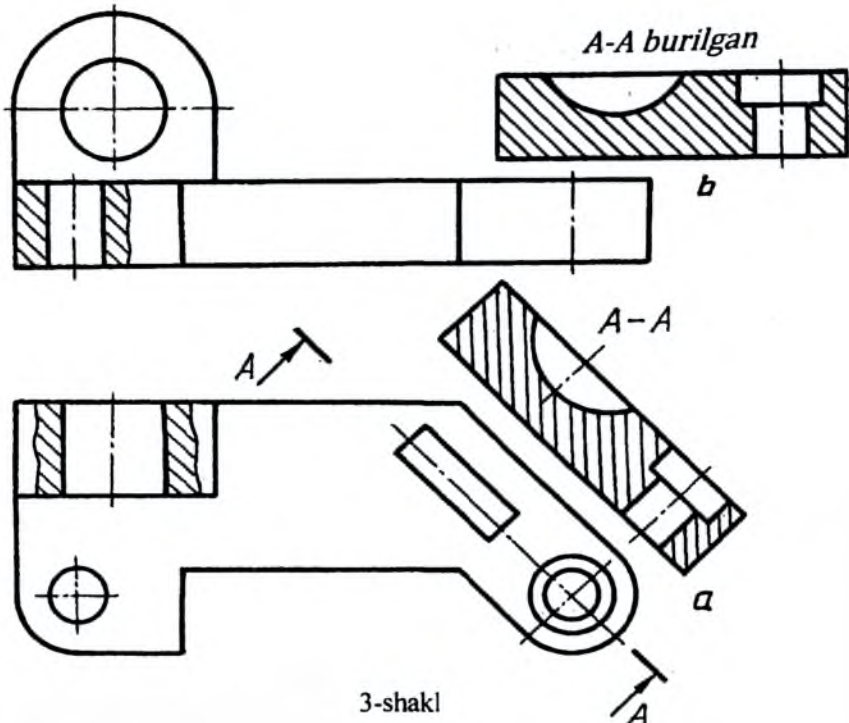
2-shakl

tipidagi qirqim ko'proq maqsadga muvofiq hisoblanadi.

Amaliyotda shunday hollar ham uchraydiki, ularda qirqimlar ham frontal, ham profil proyeksiyalar tekisliklariga parallel bo'lmagan kesuvchi tekisliklar yordamida hosil qilinadi (3-shakl). Bunday hollarda qirqim qarash yo'nalishi bo'yicha joylashtiriladi (3-shakl, *a*). Qirqimni bosh ko'rinishning vaziyatiga mos qilib, ixtiyoriy joyda, burib tasvirlashga ham ruxsat etiladi. Bunday hollarda qirqim ustidagi yozuvga "burilgan" so'zi yoki belgi (O) qo'shib qo'yiladi (3-shakl, *b*).

Ayrim paytlarda og'ma qirqim yoki kesimlarni butun detallarni qirqish orqali ham hosil qilinadi. Quyida bir qator shunday misollarni ko'rib chiqamiz.

4-shakl, *a* dagi A—A ko'rinish og'ma kesimga, 4-shakl, *b* dagi B-B ko'rinish og'ma qirqimga misol bo'la oladi. Og'ma kesim yuzasi o'zining haqiqiy kattaligida tasvirlanadi va uni yasash uchun A—A tekislik kesib o'tgan detal ko'rinishidagi 1", 2", 3", 4", 5" nuqtalar belgilanadi. Bu nuqtalarning ustdan hamda yondan ko'rinishlaridagi o'rinlari topilib



qiya kesim proyeksiyalari aniqlanadi. Og'ma kesimning haqiqiy kattaligini yasash uchun  $1''$ ,  $5''$  nuqtalardan tekislik izi  $A—A$  ga perpendikular yordamchi chiziqlar o'tkaziladi.  $A—A$  ga parallel qilib o'q chiziq  $i$  o'tkaziladi va unga nisbatan detalning yon yoki ustdan ko'rinishlarida kesim nuqtalari mos holda o'lchab qo'yiladi. Bu nuqtalarni birlashtirib chiqish natijasida og'ma kesimning haqiqiy kattaligi yasaladi (4- shakl, a).

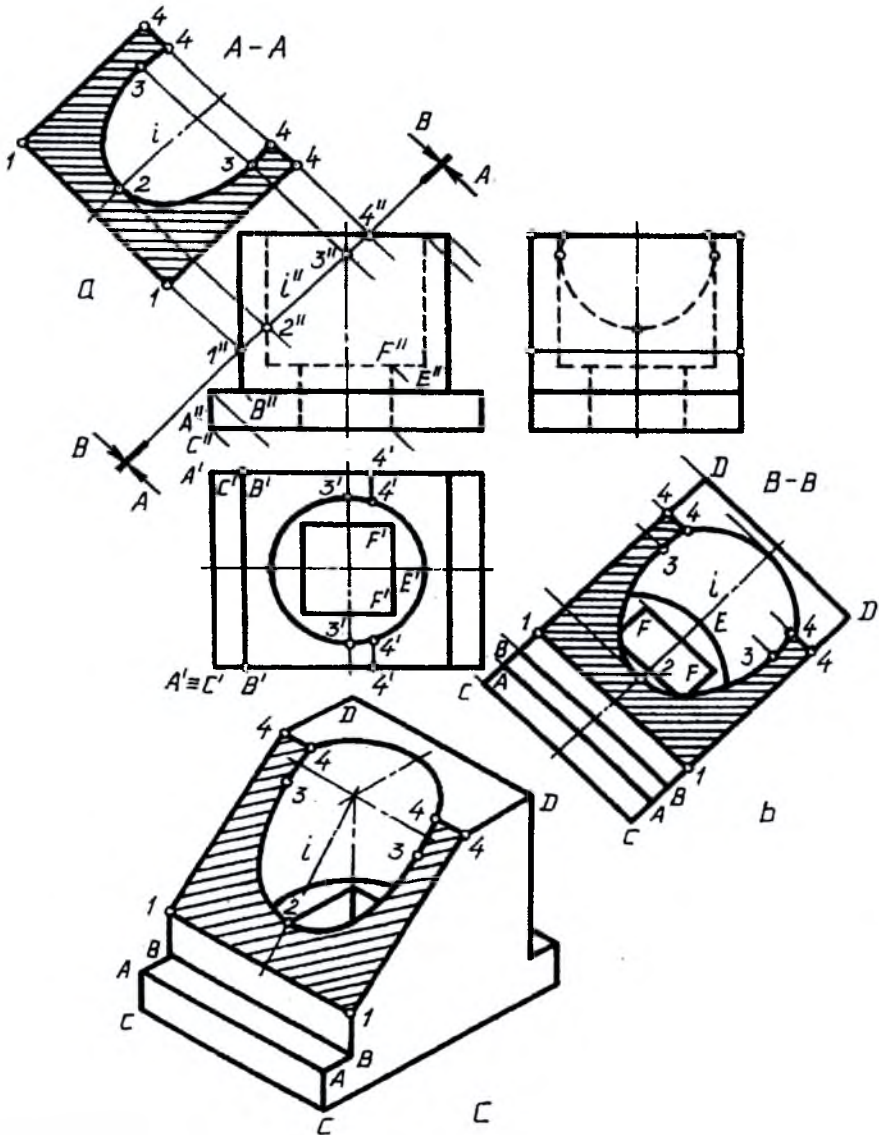
$B—B$  qirqimdagi kesim yuzasi ham  $A—A$  ga o'xshab yasaladi. Bu kesimni qiya qirqimga aylantirish uchun  $B—B$  tekislik orqasidagi detal qismlarining ko'rinadigan kontur chiziqlari kesim yuzasining haqiqiy kattaligiga qo'shib chiziladi. Buning uchun  $B—B$  tekislikka nisbatan perpendikular vaziyatda qaralganda detal konturining tashqi nuqtalari  $A''$ ,  $B''$ ,  $D''$ ,  $E''$  va ichki kontur nuqtalari  $E''$ ,  $F''$  ko'rinadi. Shuning uchun bu nuqtalardan  $B—B$  ga perpendikular yordamchi chiziqlar o'tkaziladi va bu chiziq'larga detalning yon ko'rinishidan mos holda kerakli nuqtalar olib o'tiladi. Natijada og'ma qirqim hosil bo'ladi (4- shakl, b).

Detailning qiya qirqimdan keyingi qolgan qismini yaqqol tasvirda yasash uchun oldin detalning yaxlit holatini izometriyada chizib olinadi. Yaqqol tasvirda kesuvchi tekislikning simmetriya o'qi  $i$  aniqlanadi.  $i$  o'qqa og'ma qirqimdagi  $i''$  da joylashgan kesim yuzasi konturi nuqtalari olib o'tiladi. Hosil qilingan nuqtalar yordamida og'ma qirqim yaqqol tasvirda yasaladi (4-shakl, d).

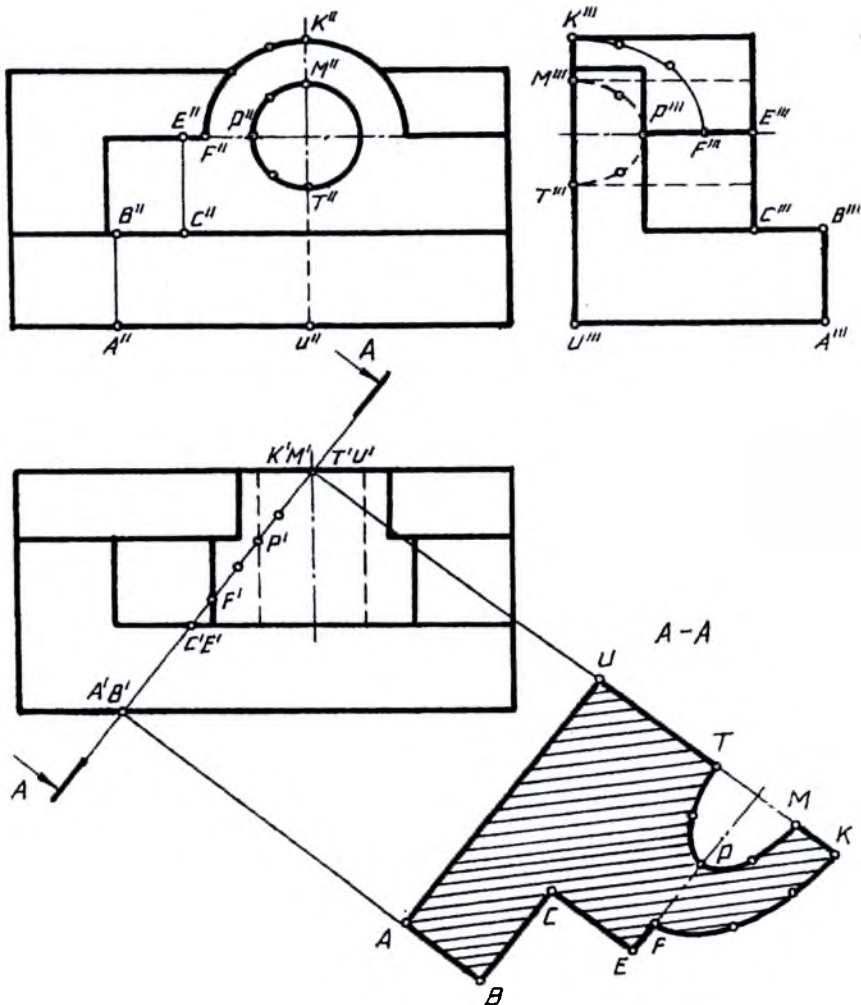
5-shaklda buyumning  $H$  ga proyeksiyalovchi tekislik bilan kesishishi natijasida hosil bo'lgan kesimining frontal va profil proyeksiyalarini yasash hamda uning xaqiqiy kattaligini aniqlash ko'rsatilgan. Kesuvshi tekislikning gorizontall izi, y'ani kesim chizig'i  $A—A$  bilan ifoda qilingan.

Kesimni aniqlovchi kontur chizig'ini yasash uchun buyum sirtida joylashgan, kesuvchi tekislik bevosita uchrashadigan to'g'ri va egri chiziqlarni aniqlaymiz. Bu chiziqlarning berilgan proyeksiyalovchi tekislik bilan kesishgan  $A'A''$ ,  $B'B''$ ,  $C'C''$ , ... proyeksiyalarini ketma-ket tutashtirib, kesimning frontal  $A''B''C''E''F''K''M''P''T''U''$  proyeksiyasini hosil qilamiz, gorizontall proyeksiyasi kesim chizig'i  $A—A$  bilan ustma-ust tushib qoladi. Chizmaning doimiy to'g'ri chizig'i yordamida kesimning profil proyeksiyasini aniqlaymiz, u



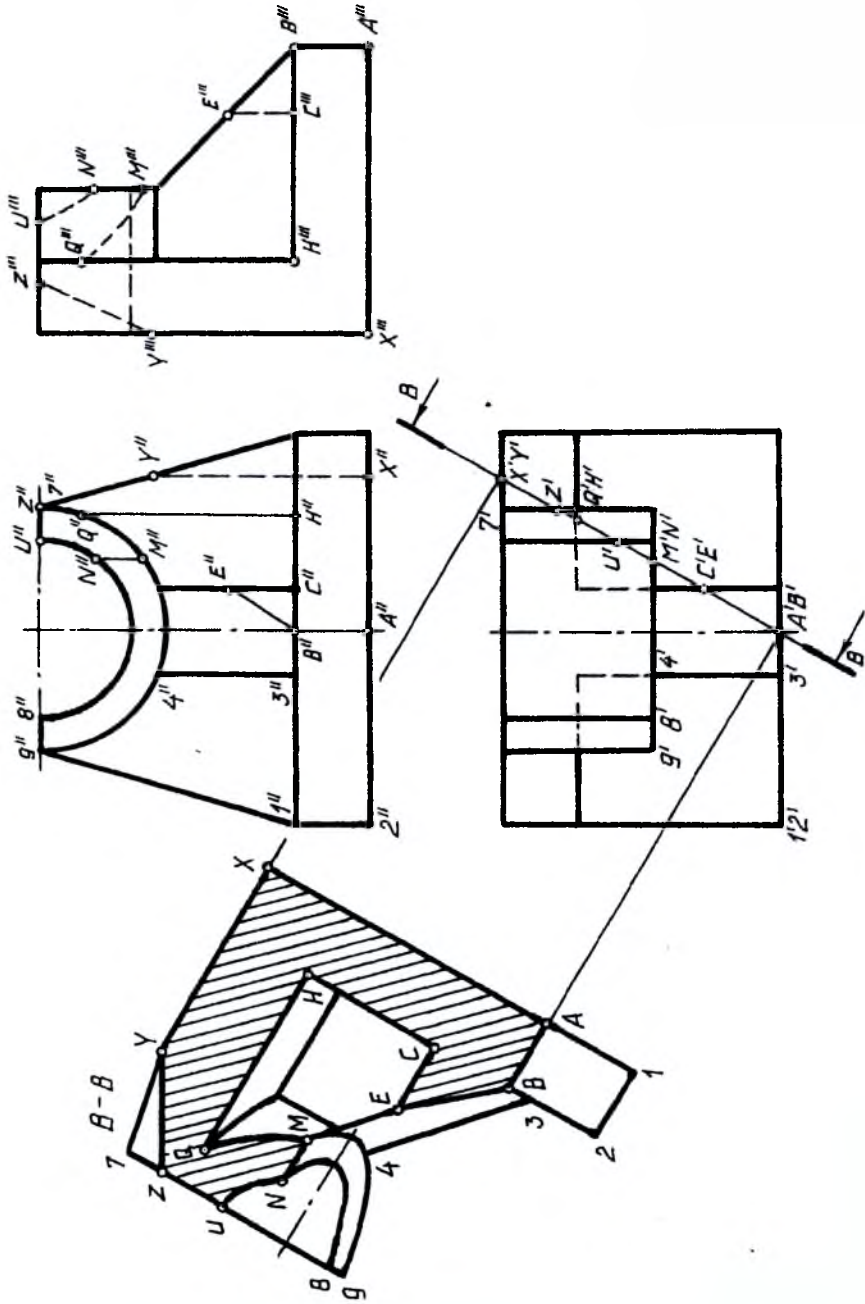


4-shakl



5-shakl

$A''B''C''E''F''K''M''P''T''U''$  bo'ladi. Endi kesimning xaqiqiy kattaligini aniqlaymiz. Buning uchun kesim tekisligiga parallel qilib yangi frontal proyeksiyal tekisligini o'tkazamiz. Bu tekislikning gorizontali  $A-A$  ga parallel bo'lishi va  $AU$  orqali o'tishi aniq. Shunga ko'ra  $A', B', C', \dots$  nuqtalardan  $A-A$  ga perpendikulyar chiqaramiz va

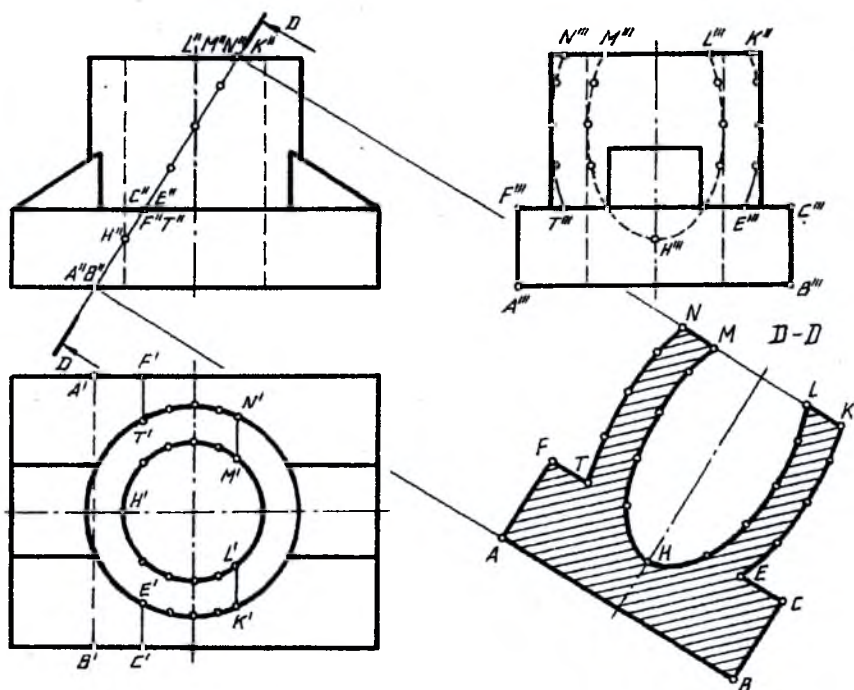


6-shaki

ularga AU orqali o'tgan chiziqdan boshlab bu nuqtalarning applikatorini o'lchab qo'yamiz. Hisoblash to'g'ri chizig'i sifatida  $A''U''$  olinadi. Hosil bo'lgan A,B,C, ... nuqtalarni o'zaro birlashtirsak izlanayotgan kesim yuzasining xaqiqiy kattaligi konturi ABCEFKMPTU ga ega bo'lamiz va uni shtrixlab qo'yamiz.

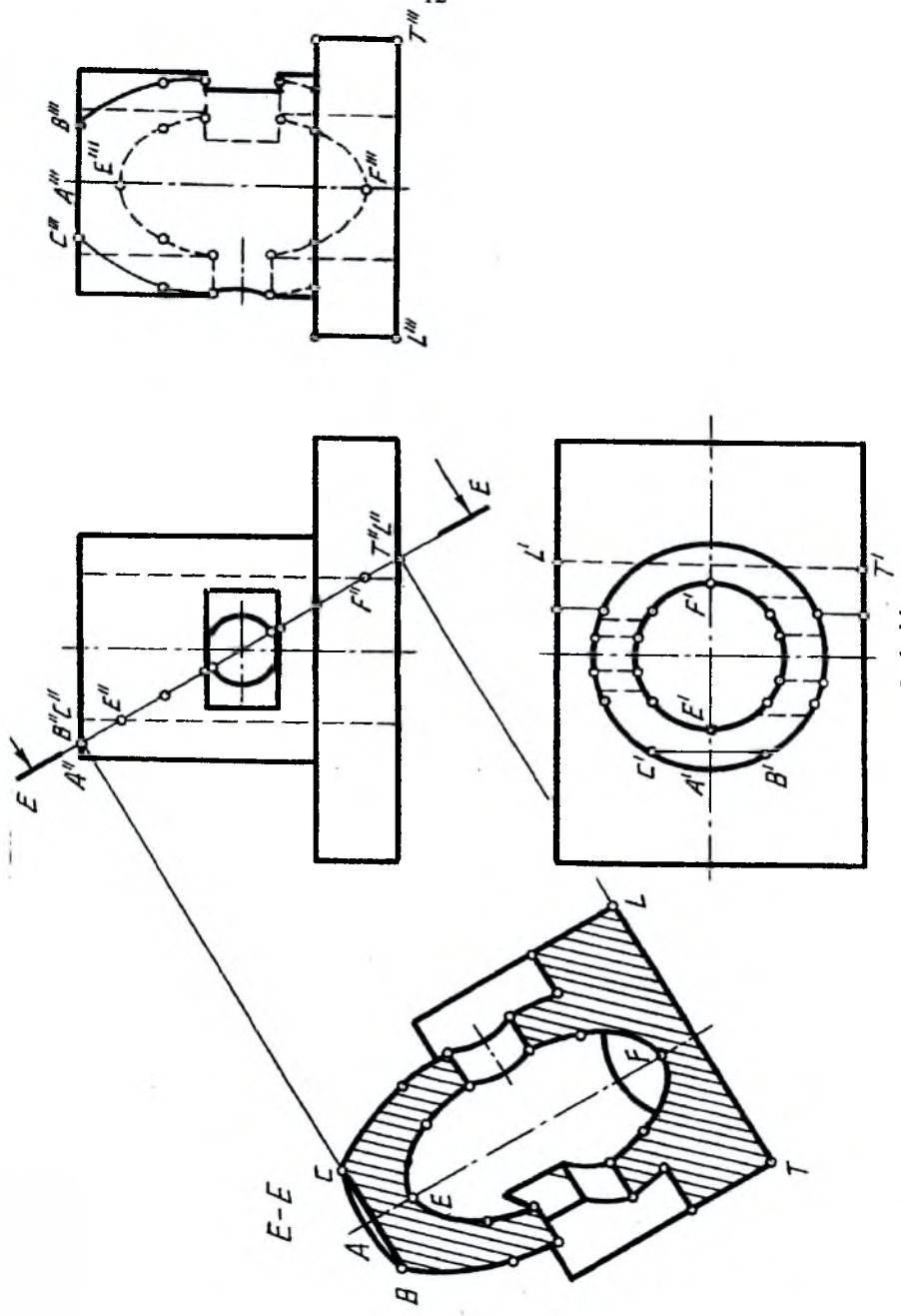
6-shaklda buyumning H ga proyeksiyalovchi tekislik bilan kesishishi natijasida hosil bo'lgan qirqimning frontal va profil proyeksiyalarini yasash hamda frontal proyeksiyalar tekisligida qirqimning o'zini qurish ko'rsatilgan. Qirqim chizig'i B—B bilan ko'rsatilgan.

5-shaklda ko'rsatilganidek, buyum sirtiga tegishli, lekin berilgan proyeksiyalovchi tekislikni kesadigan chiziqlarni aniqlaymiz va ularning o'zaro uchrashgan  $A'A''$ ,  $B'B''$ ,  $C'C''$ , ... nuqtalarini topamiz. Bu nuqtalarning frontal proyeksiyalarini tartib bilan



tutashtirsak,

7-shakl

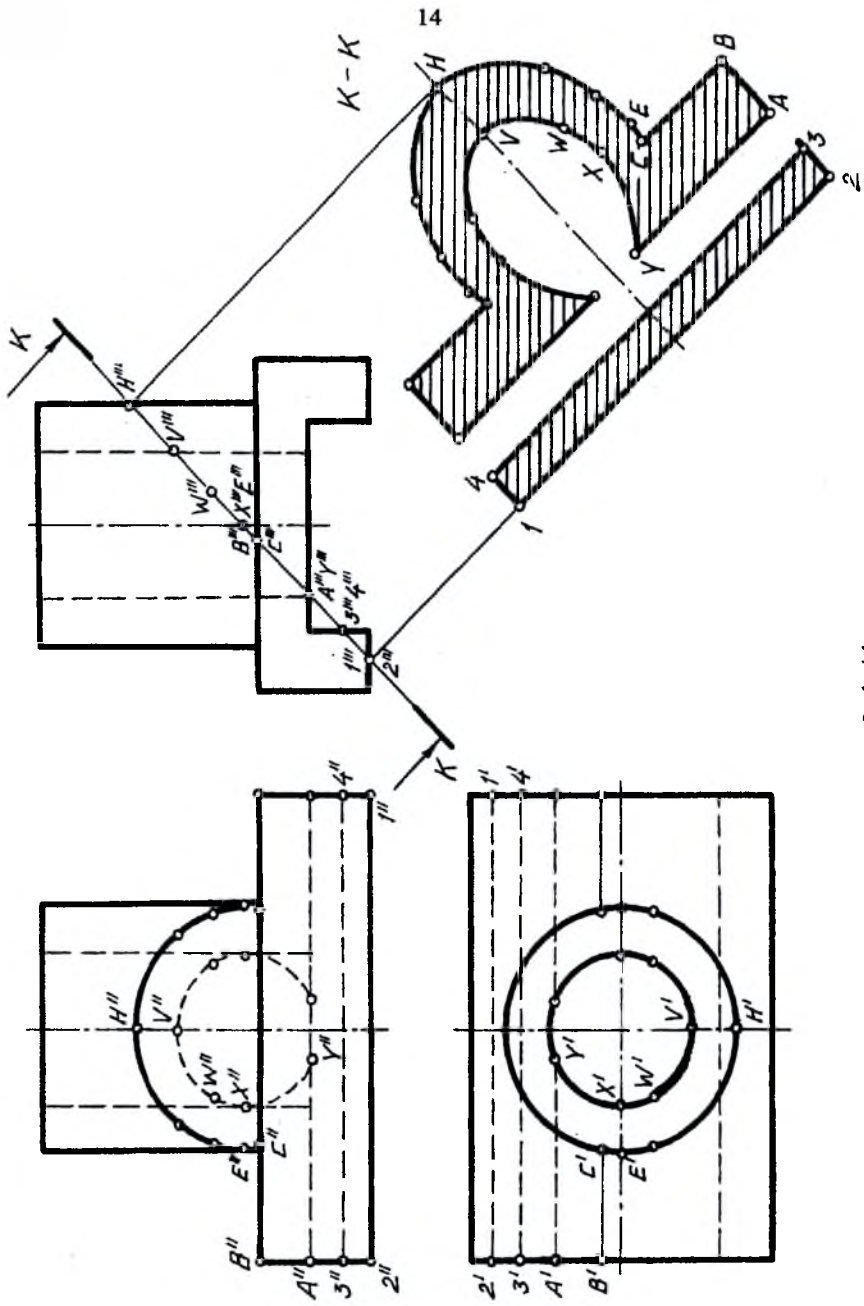


8-shakl

$A''B''E''C''H''Q''M''N''U''Z''Y''X''$  shakl hosil bo'ladi. Bu izlanayotgan qirqimning frontal proyeksiyasidir, qirqimning gorizontal proyeksiyasi  $B—B$  iz bilan ustma-ust tushib qoladi, profil proyeksiyasi  $A''B''E''C''H''Q''M''N''U''Z''Y''X''$  esa chizmaning doimiy to'g'ri chizig'i yordamida topiladi. Kesim yuzasining xaqiqiy kattaligini proyeksiyalar tekisligini almashtirish usuli bilan aniqlaymiz. Buning uchun kesim tekisligiga parallel qilib yangi frontaql proyeksiyalar tekisligini o'tkazamiz, uning izi  $B—B$  ga parallel bo'lib,  $AX$  orqali o'tadi.  $A', B', E', \dots$  nuqtalardan bu chiziqqa perpendikulyar chiqarib, ularga nuqtalarning applikatorlarini  $AX$  dan o'lchab qo'yib,  $A, B, E \dots$  nuqtalarni hosil qilamiz (bu yerda  $AX$  hisoblash to'g'ri chizig'i deb olinadi). Topilgan nuqtalarni bir-biri bilan tutashtirsak, kesimning xaqiqiy kattaligi  $ABECHQMNUZYX$  hosil bo'ladi. Bu yangi frontal proyeksiyalar tekisligiga kesuvchi tekislikning orqasida yotgan, lekin kuzatuvchiga ko'rinadigan chiziqlarning nuqtalarini, masalan,  $1'1, 2'2, 3'3, \dots$  proyeksiyalab, ularning  $1, 2, 3, \dots$  proyeksiyalarini topamiz va o'zaro birlashtiramiz. Yangi proyeksiyalar tekisligida tasvir qilingan  $12, 23, 34, \dots$  chiziqlar bilan unung kesimi birgalikda izlanayotgan qirqimni ifoda qiladi.

7-shaklda detalning  $V$  ga proyeksiyalovchi tekislik bilan kesishishi natijasida hosil bo'lgan kesimning gorizontal va profil proyeksiyalarini yasash hamda uning xaqiqiy kattaligini aniqlash ko'rsatilgan. Kesim chizig'i  $D—D$  bilan ifoda qilingan.

Kesimni chegaralaydigan chiziqlarning nuqtalarini topish uchun buyum sirtida yotuvchi, lekin berilgan proyeksiyalovchi tekislik bilan kesishadigan chiziqlarni aniqlaymiz va ularning o'zaro uchrashgan  $A'A'', F'F'', T'T'', \dots$  nuqtalarini topamiz. Bu nuqtalarning frontal proyeksiyalari  $D—D$  to'g'ri chiziqda bo'ladi, orizontal proyeksiyalari esa o'zaro birlashtirilib, kesimning  $A'F'T'N'M'H'L'K'E'C'B'$  proyeksiyasi aniqlanadi. Kesimning profil proyeksiyasi chizmaning doimiy to'g'ri chizig'idan foydalanib topiladi va  $A''F''T''N''M''H''L''K''E''C''B''$  ko'rinishida bo'ladi. Kesimning xaqiqiy kattaligini aniqlash uchun kesuvchi tekislikka parallel qilib, yangi gorizontal proyeksiyalar tekisligini o'tkazamiz, uning frontal izi  $D—D$  ga parallel bo'lib  $AF$  to'g'ri chiziq orqali o'tadi.  $A', F', T', \dots$  nuqtalardan bu chiziqqa



9-shakl

(baribir  $D \rightarrow D$  ga) perpendikulyarlar chiqaramiz. So'ngra ularga  $AF$  to'g'ri chiziqdan nuqtalarning ordinatalarini mos ravishda o'lchab qo'yib, ularning  $A', F', T', \dots$  proyeksiyalarini aniqlaymiz. Topilgan nuqtalarni o'zaro tutashtirib, kesimning xaqiqiy kattaligi  $AFTNMHLKECB$  ni hosil qilamiz.

8-shaklda detalni frontal proyeksiyalovchi tekislik bilan kesib og'ma qirqim hosil qilish ko'rsatilgan. Kesuvchi tekislikning frontal izi  $E - E$  chiziq bilan ifodalangan.

5-8-shakllarda ko'rsatilganidek, detalning bu tekislik bilan kesishadigan chiziqlarini aniqlab, so'ngra ularning o'zaro uchrashgan  $B'B'', C'C'', \dots$  nuqtalarini topamiz. Bu nuqtalarning frontal proyeksiyalari kesuvchi tekislikning  $E - E$  chizig'ida bo'ladi. Agar ularning gorizontaal proyeksiyalarini tegishli ravishda ketma-ket birlashtirsak, kesimning gorizontaal proyeksiyasi hosil bo'ladi. Kesimning profil proyeksiyasini chizmaning doimiy to'g'ri chizig'i yordamida aniqlaymiz. Bu yerda kesimning tashqi konturini  $B'C'L'T'B', B''C''L''T''B''$  egri chiziq, ichki konturini esa  $E'E''$  va  $F'F''$  nuqtalar orqali o'tuvchi egri chiziq ifoda qiladi. Bu kesimning xaqiqiy kattaligini aniqlash uchun kesuvchi tekislikka parallel qilib yangi gorizontaal proyeksiyalar tekisligini o'tkazamiz, uning frontal izi  $E-E$  ga parallel bo'ladi va  $L$  nuqta orqali o'tadi. Kesim nuqtalarining  $B'', C'', E'', \dots$  proyeksiyalaridan  $E-E$  ga perpendikulyar to'g'ri chiziqlar chiqaramiz va ularga  $L$  nuqta orqali  $E-E$  ga parallel bo'lgan to'g'ri chiziqdan boshlab  $B'B'', C'C'', E'E'', \dots$  nuqtalarning ordinatalarini o'lchab qo'yamiz. Hosil bo'lgan  $B, C, E, \dots$  nuqtalar o'zaro ketma-ket tutashtirilsa, kesimning xaqiqiy kattaligiga ega bo'linadi. So'ngra yangi gorizontaal proyeksiyalar tekisligiga kesuvchi tekislik orqasida joylashgan, lekin kuzatuvchiga ko'rinadigan chiziqlarning nuqtalarini proyeksiyalab, topilgan  $A, B, C, \dots$  nuqtalarni birlashtiramiz. Demak, yangi gorizontaal proyeksiyalar tekisligida berilgan detalning qirqimi hosil bo'ladi.

9-shaklda buyumning  $W$  ga proyeksiyalovchi tekislik bilan kesishishi natijasida hosil bo'lgan kesimning gorizontaal va frontal proyeksiyalarini yasash hamda uning xaqiqiy kattaligini aniqlash ko'rsatilgan. Kesim chizig'i  $K-K$  bilan ifoda qilingan.

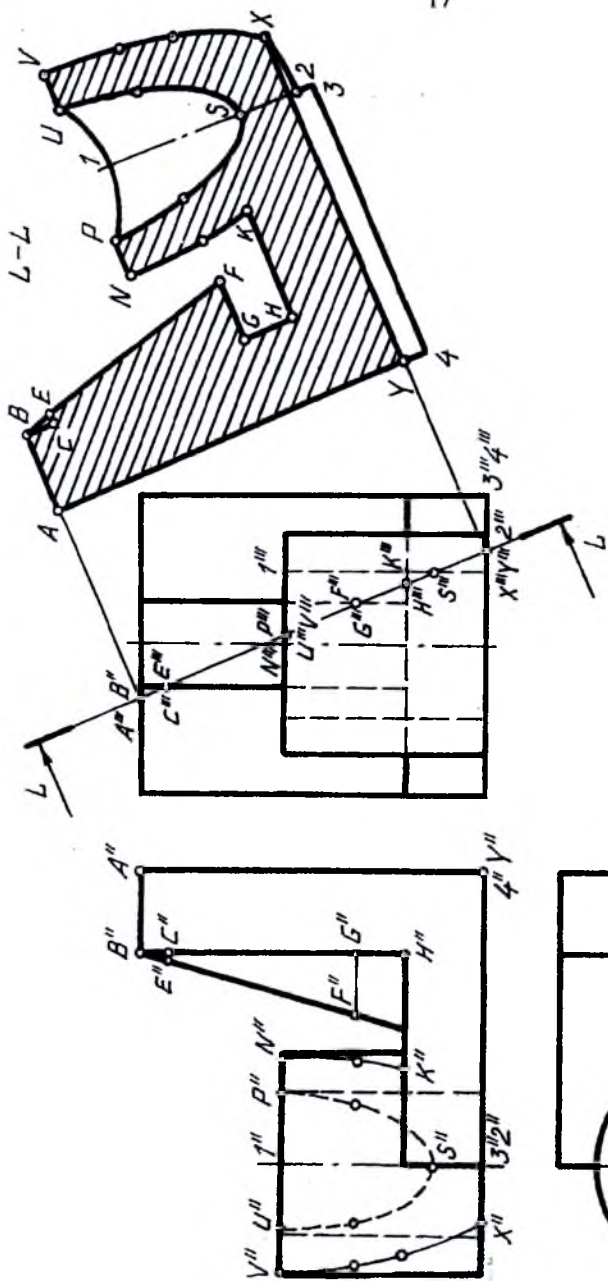


Bu yerda ham 6-8-shakllardagidek, kesimning kontur chiziqlarining nuqtalarini aniqlash uchun buyum sirtida joylashgan, berilgan proyeksiyalovchi tekislik bilan kesishadigan chiziqlarini aniqlab, ularning o'zaro uchrashgan  $A''A'''$ ,  $B''B'''$ ,  $C''C'''$ , ... nuqtalarini topamiz. Bu nuqtalarning profil proyeksiyalari  $K-K$  izda bo'ladi, frontal proyeksiyalari esa proyeksiyalab topilgan  $A'', B'', C'', E'', \dots, X'', Y''$  va  $1'', 2'', 3'', 4''$ , nuqtalarni mos ravishda ketma-ket tutashtirib hosil qilinadi. Uning gorizontaal proyeksiyasi chizmaning doimiy to'g'ri chizig'i yordamida aniqlanadi va  $A'B'C'E', \dots, W'X'Y'$  hamda  $1'2'3'4'$  lardan iborat bo'ladi. Bu kesimning xaqiqiy kattaligini topish uchun kesuvchi tekislikka parallel qilib yangi profil proyeksiyalar tekisligini o'tkazamiz, uning profil izi kesim chizig'i  $K-K$  ga parallel bo'lgan 14 to'g'ri chiziq kesmasi orqali o'tadi. Bu izga (baribir  $K-K$  ga)  $A''', B''', C''', E''', \dots$  hamda  $1''', 2''', \dots$  nuqtalardan perpendikulyarlar chiqaramiz. So'ngra ularga 14 kesma orqali o'tgan chiziqdan bu nuqtalarning absissalarini mos ravishda o'lchab qo'yamiz. Hosil bo'lgan  $A, B, C, E, \dots, W, X, Y$  hamda  $1, 2, 3, 4, \dots$  nuqtalarni o'zaro ketma-ket tutashtirsak kesimning xaqiqiy kattaligi hosil bo'ladi.

10-shaklda detaining  $W$  ga proyeksiyalovchi tekislik bilan kesishishi natijasida hosil bo'lgan qirqimning gorizontaal va frontal proyeksiyalarini yasash hamda kesim yuzasining xaqiqiy kattaligini aniqlash ko'rsatilgan. Kesuvchi tekislikning izi  $L-L$  bilan ifoda qilingan.

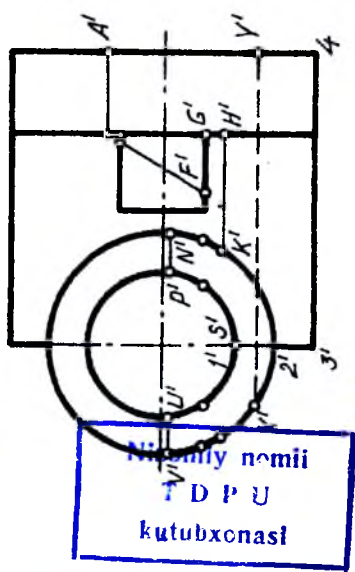
Buyum sirtiga tegishli bo'lgan, lekin kesuvchi tekislik bilan umumiy nuqta hosil qiladigan chiziqlarni aniqlaymiz va ularning o'zaro uchrashgan  $A''A'''$ ,  $B''B'''$ ,  $C''C'''$ ,  $F''F'''$  nuqtalarini topamiz. Bu nuqtalarning profil proyeksiyalari kesim chizig'ida, ya'ni izi  $L-L$  da bo'ladi. Frontal proyeksiyalari esa kesimning frontal proyeksiyasi  $A''B''C''E''F''G''H''K''N''P''S''U''V''X''Y''$  hosi qiladi. Kesimning gorizontaal  $A'B'C'E'F'G'H'K'N'P'S'U'V'X'Y'$  proyeksiyasi chizmaning doimiy to'g'ri chizig'i yordamida aniqlanadi.

Kesimning xaqiqiy kattaligini topish uchun kesuvchi tekislikka parallel qilib yangi profil proyeksiyalar tekisligini o'tkazamiz, uning profil izi  $L-L$  ga parallel bo'ladi va  $AY$  to'g'ri chiziq bilan ustma-ust tushib qoladi. Kesimning kontur chizig'ini hosil qiluvchi nuqtalarning



10-shakl

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 kutubxonasi

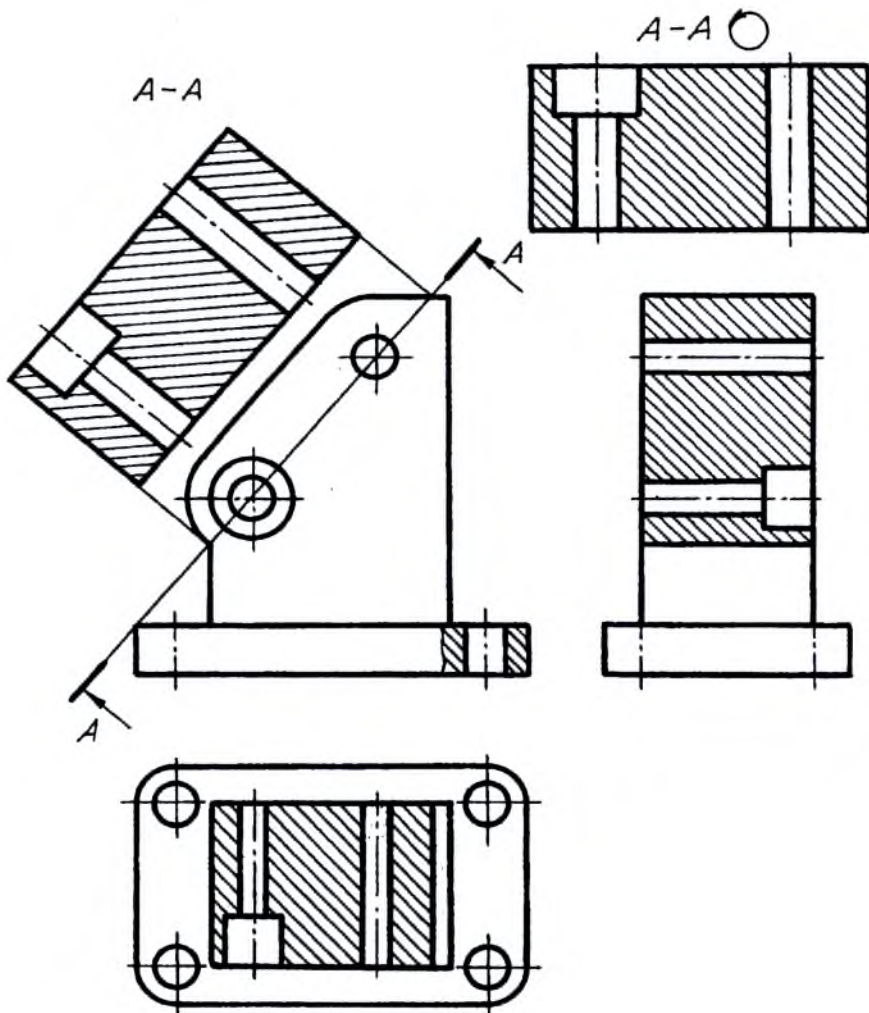
profil, ya'ni  $A'''$ ,  $B'''$ ,  $C'''$ ,  $E'''$ ,  $F'''$ , ... proyeksiyalaridan  $L—L$  ga perpendikulyarlar chiqarib, ularga  $AY$  to'g'ri chiziqdan bu nuqtalarning absissalarini o'lchab qo'yamiz. Hosil bo'lgan  $A, B, C, E, F, ...$  nuqtalarni tartib bilan tutashtirsak, kesimning xaqiqiy kattaligiga ega bo'lamiz. Bu yangi profil proyeksiyalar tekisligiga kesuvchi tekislikning orqa tomonida joylashgan, lekin kuzatuvchiga ko'rinadigan  $1'1, 2'2, 3'3, ...$  nuqtalarni proyeksiyalab, ularning  $1, 2, 3, ...$  nuqtalarni aniqlaymiz. So'ngra ularni mos ravishda kesimning tegishli nuqtalari bilan birlashtiramiz. Natijada  $P1U$  va  $Y432X$  chiziqdarga ega bo'lamiz. Bu chiziq bilan kesimning xaqiqiy kattaligi  $ABCEFGHKNPSUVXY$  birgalikda izlanayotgan qirqim bo'ladi.

**Ilova.** Muxandislik grafikasi fanlarini o'rganishning asosiy omillaridan biri - ko'p chizma chizib mashq qilishdan iboratdir. Buning uchun talabalarni, ularning bilim darajasiga mos grafik topshiriqlar na'munalari hamda variantlari bilan ta'minlash lozim. Bundan tashqari iqtidorli talabalarni ham nazarda tutib, ular uchun murakkabroq topshiriqlar variantlari berish kerak bo'ladi. Iloji bo'lsa oraliq nazorat va yakuniy ishlarni tabaqalashtirish ham maqsadga muvofiq bo'lishi mumkin.

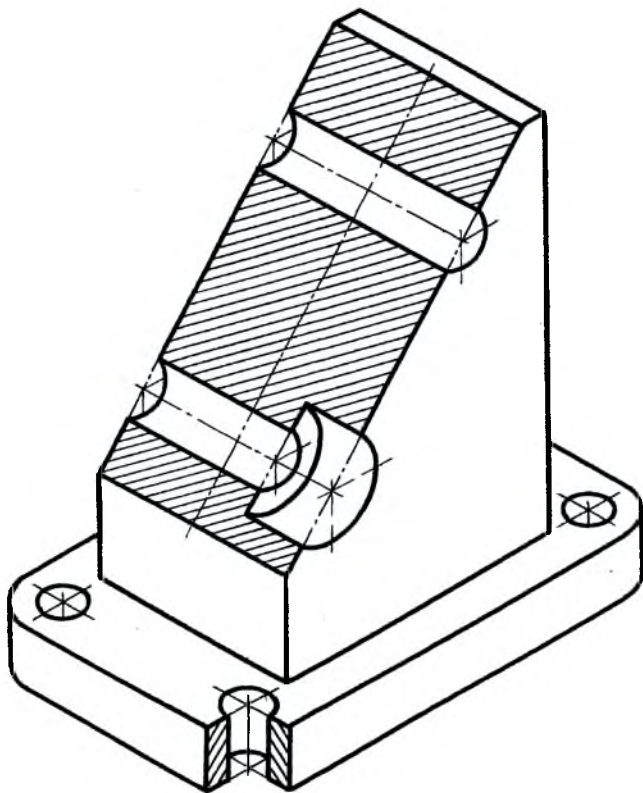
Mazkur qo'llanmada yuqoridagi fikrlarni hisobga olgan holda grafik ishlar variantlari keltirilgan. Shartli detallar variantlari muallif tomonidan maqsadga muvofiq qilib, ya'ni murakkablik darajasi va o'lchamlari hisobga olinib tuzib chiqilgan. O'lchamlari grafik ish bajariladigan chizma bichimi(format) ga moslangan.

Talabalar tomonidan og'ma qirqim yoki kesim bo'yicha grafik ishni qaysi na'muna bo'yicha bajarishni o'qituvchi belgilab beradi.

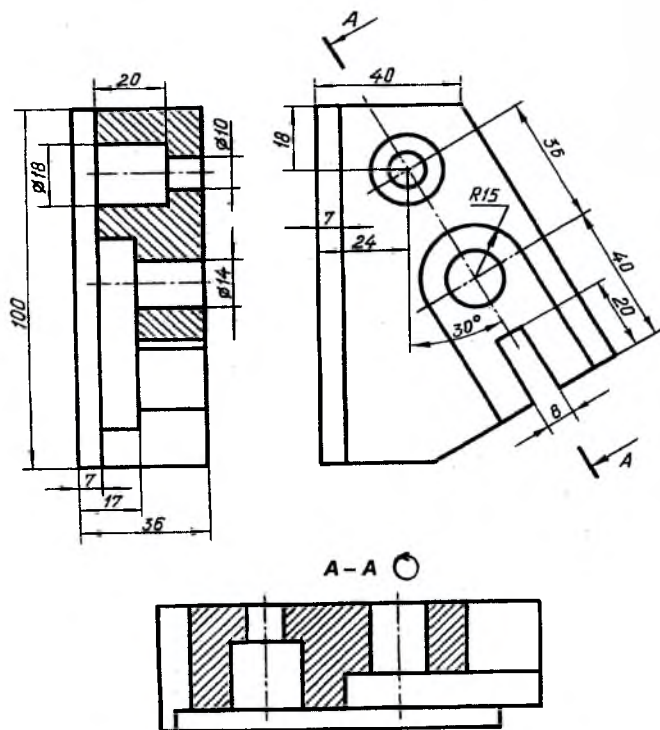
## Grafik ishlar bajarish bo'yicha na'muna va variantlar



11-shakl

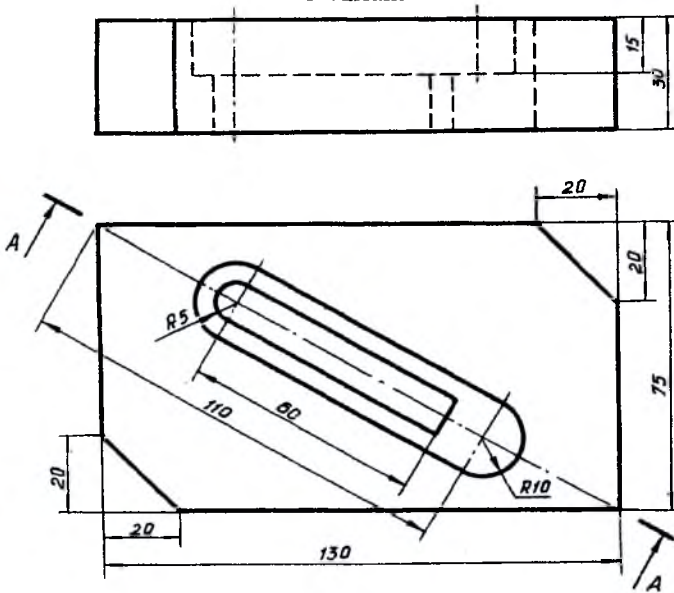
**Izometriya a: b: c= 1:1:1**

12-shakl

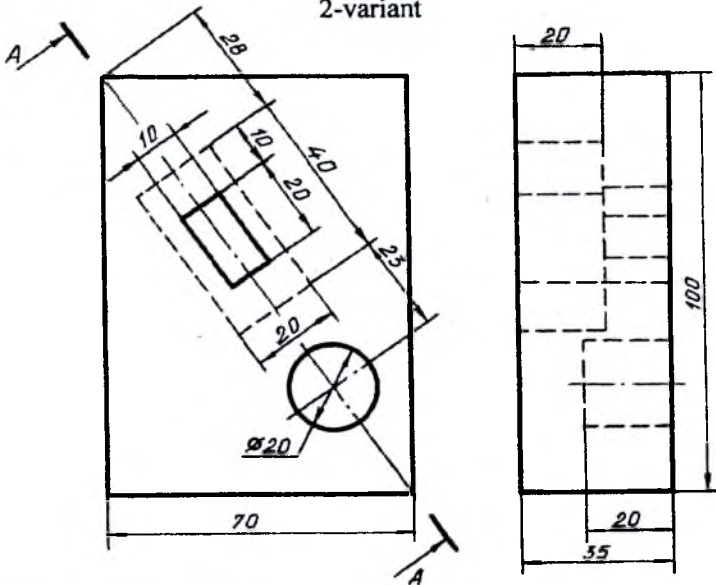


13-shakl

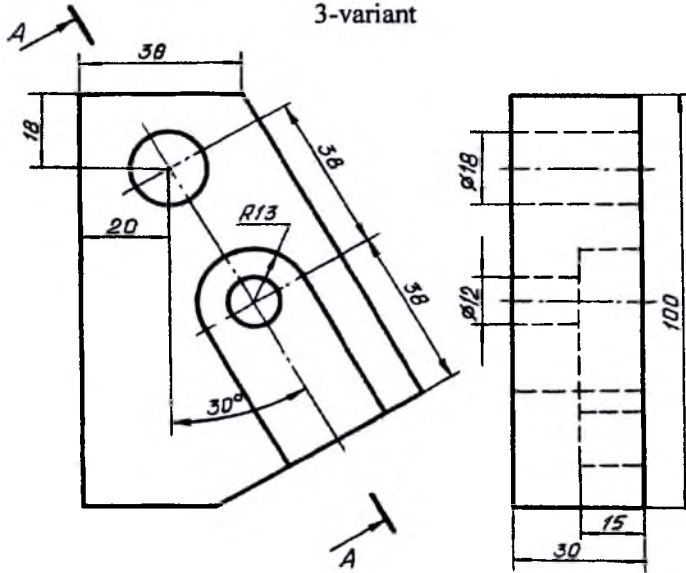
22  
1-variant



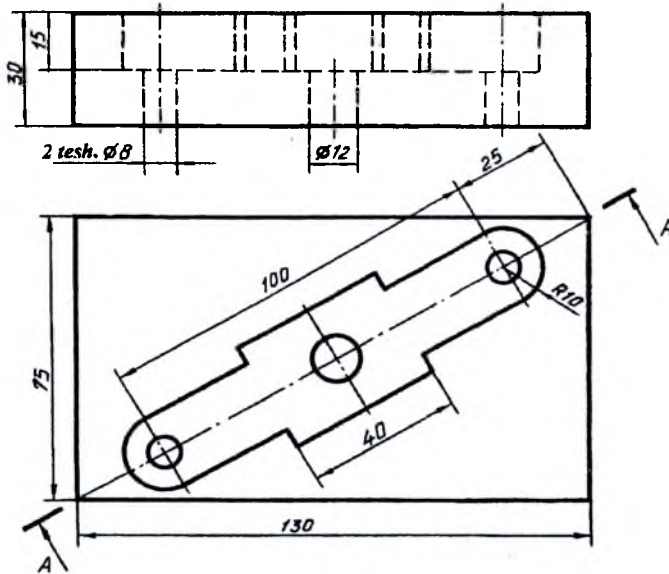
2-variant



3-variant



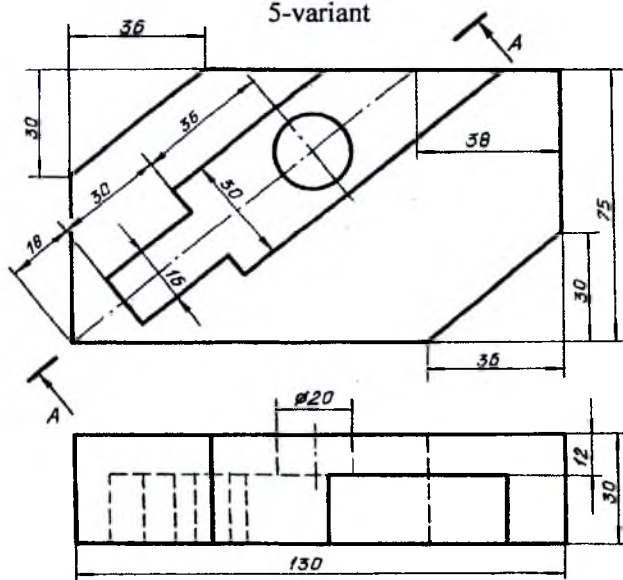
4-variant



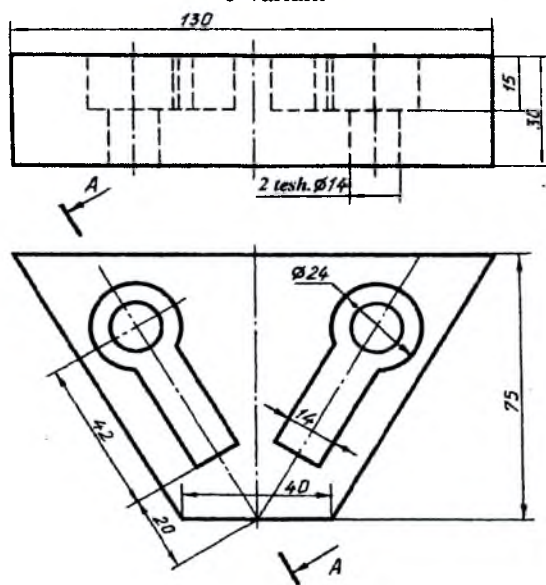


24

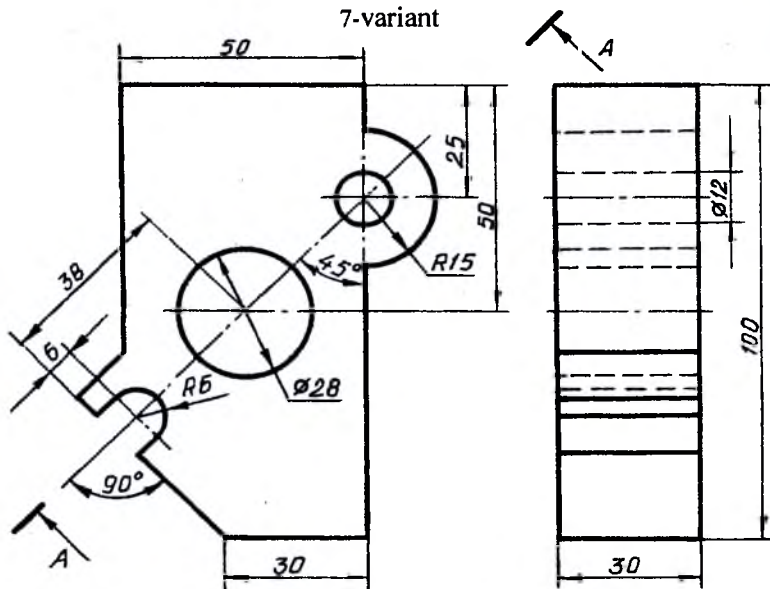
5-variant



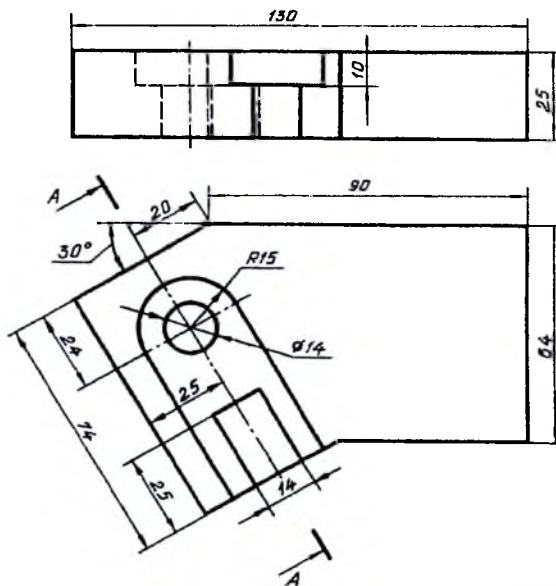
6-variant



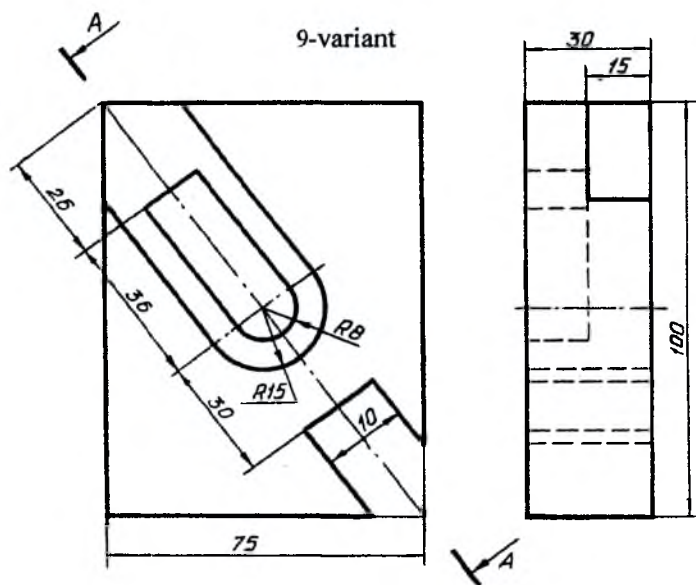
7-variant



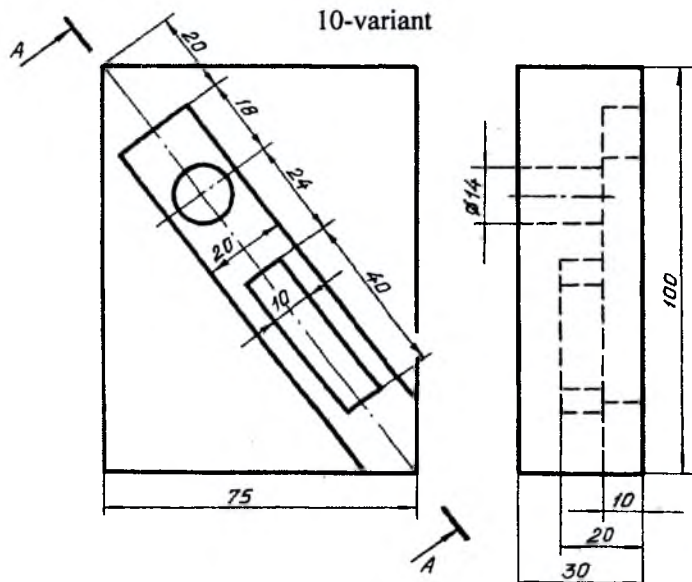
8-variant



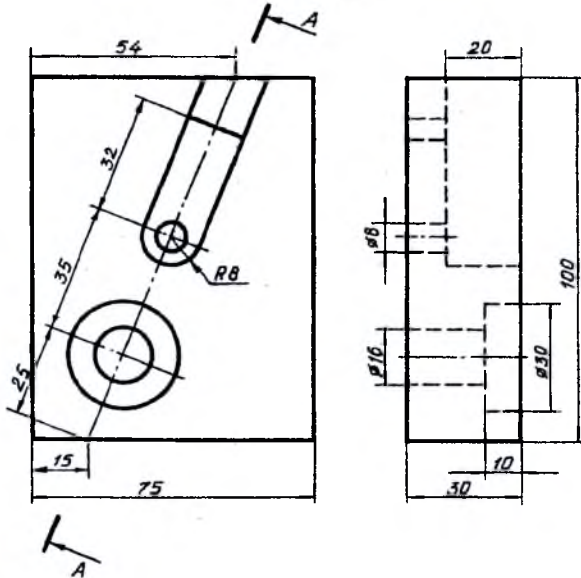
9-variant



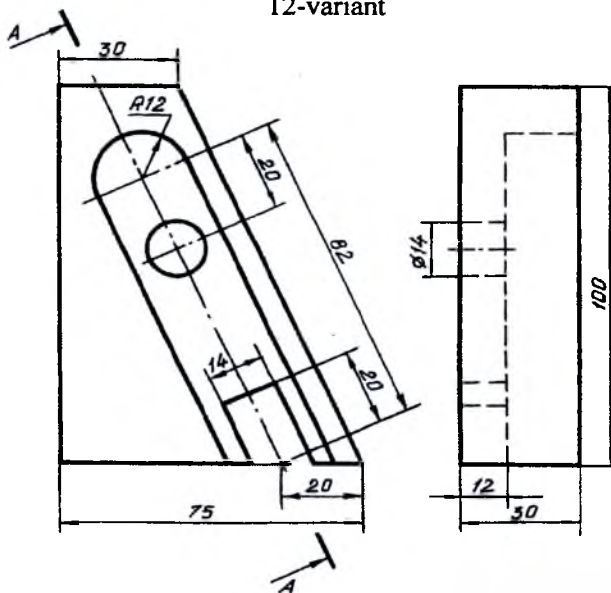
10-variant



27  
11-variant

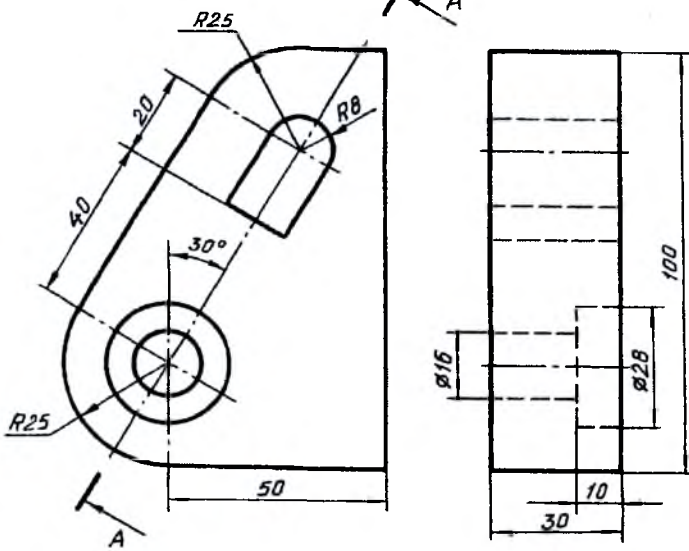


12-variant

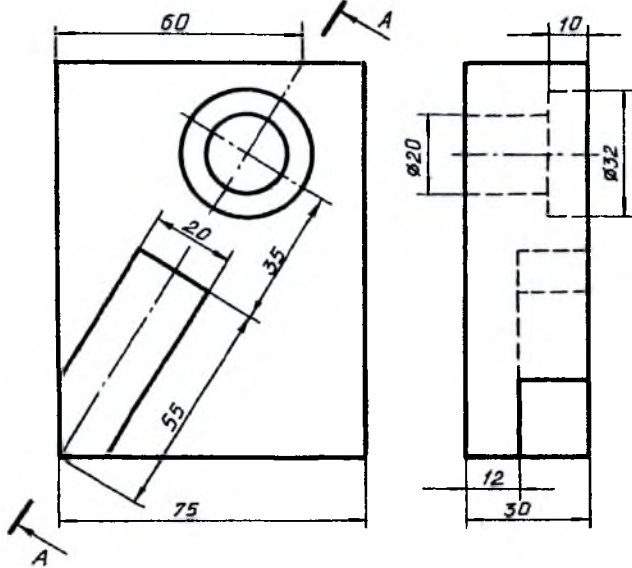


28

13-variant

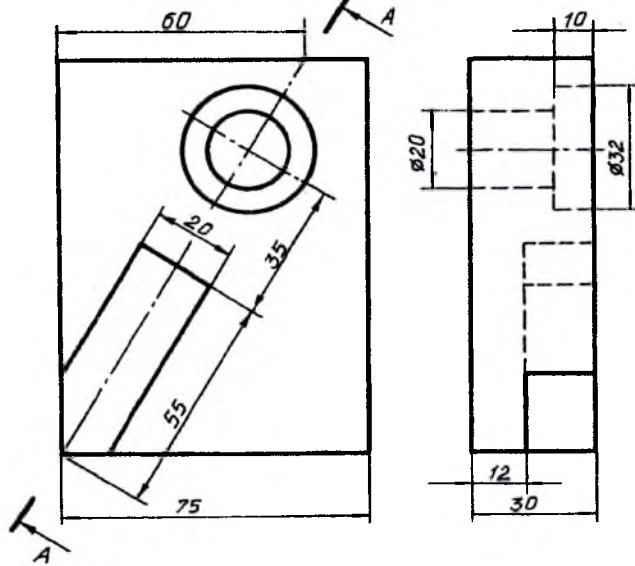


14-variant

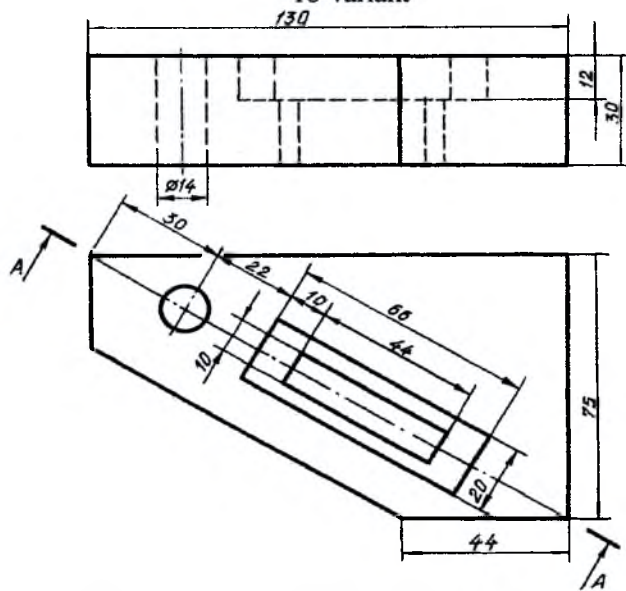


29

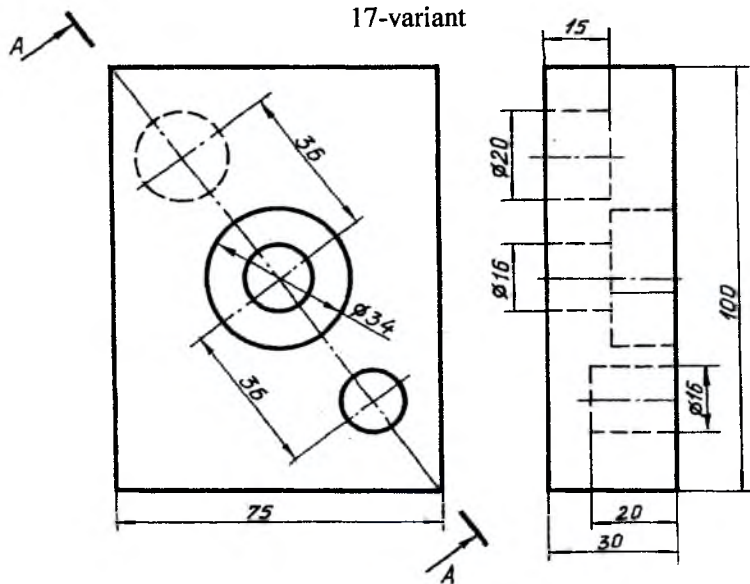
15-variant



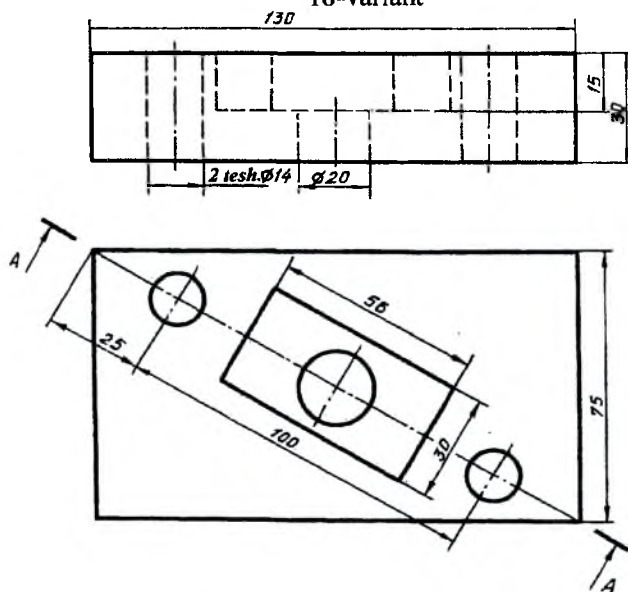
16-variant



17-variant

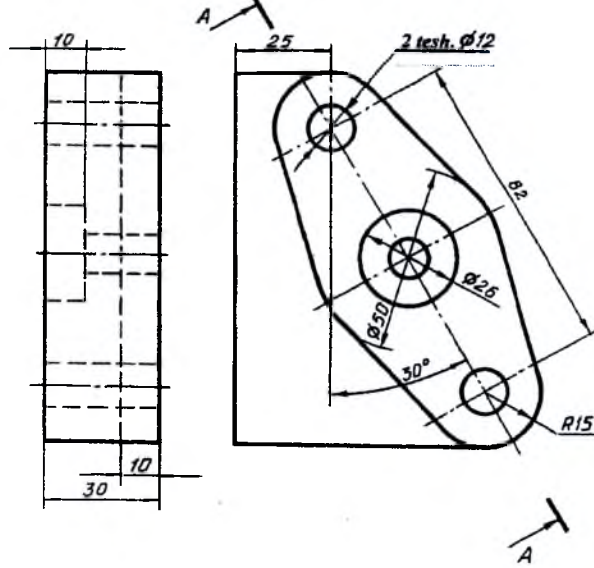


18-variant

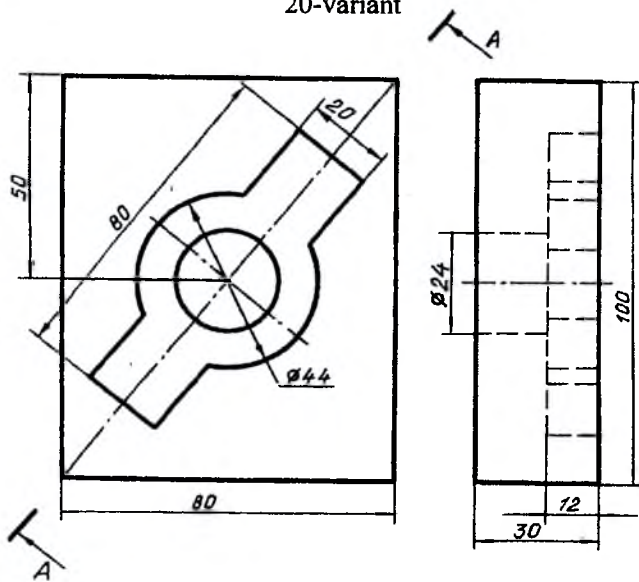


31

19-variant

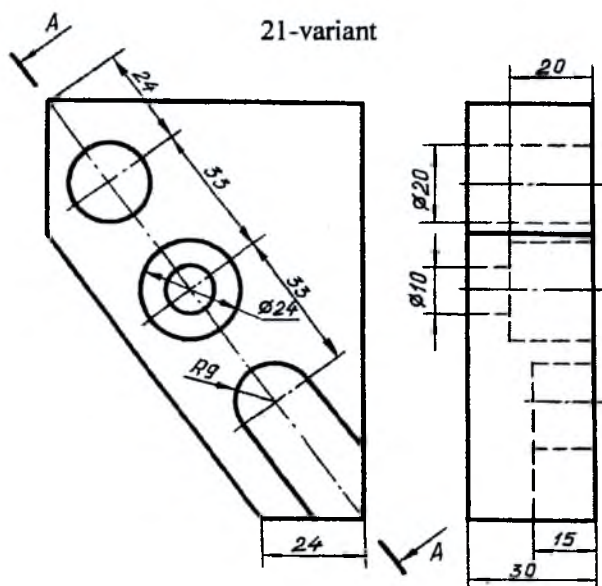


20-variant

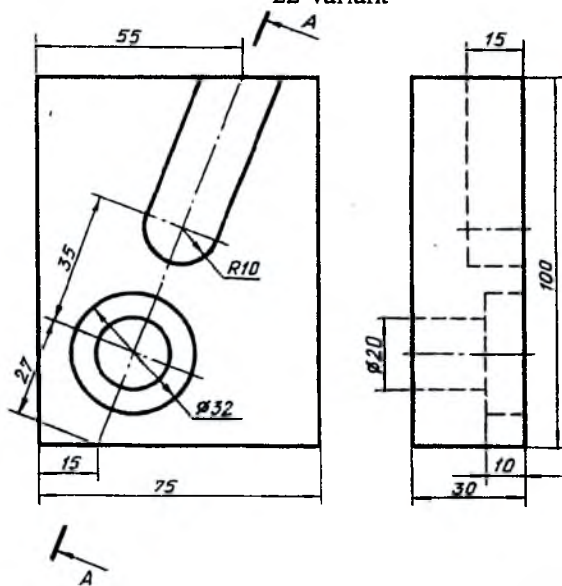




21-variant

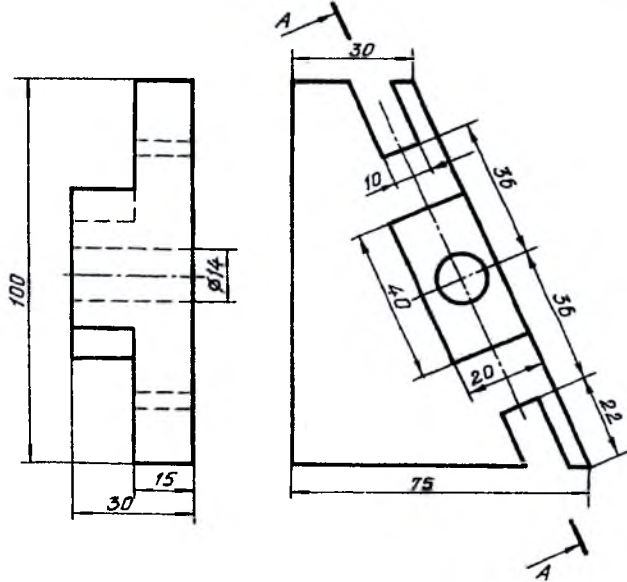


22-variant

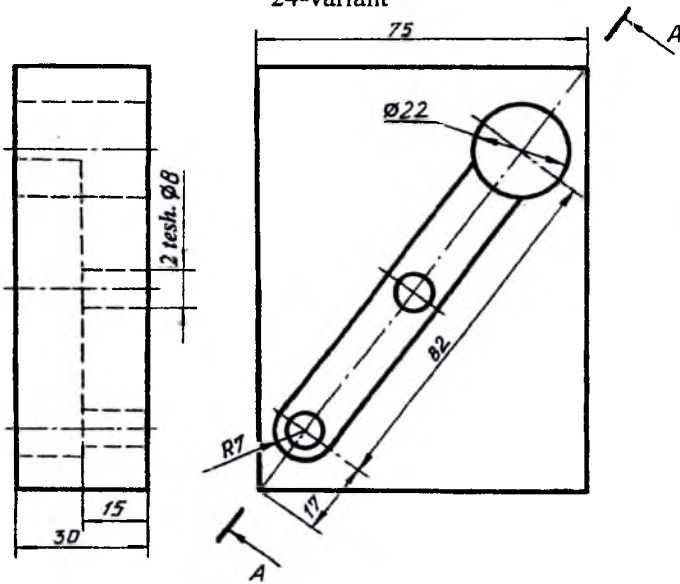


33

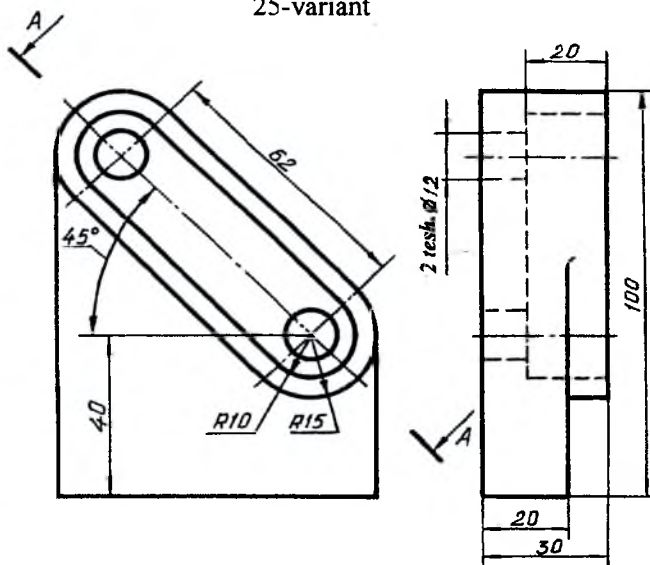
23-variant



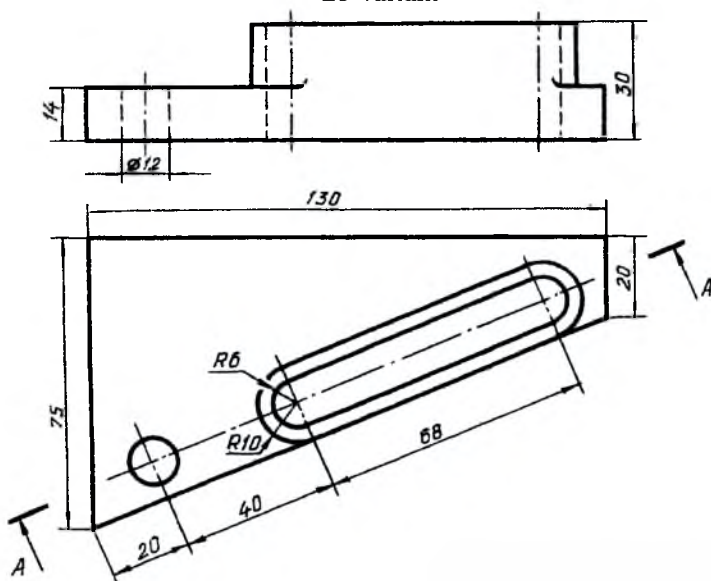
24-variant



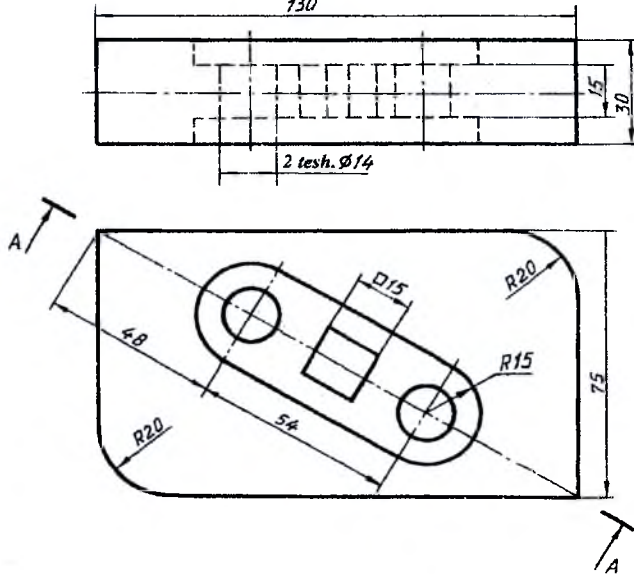
25-variant



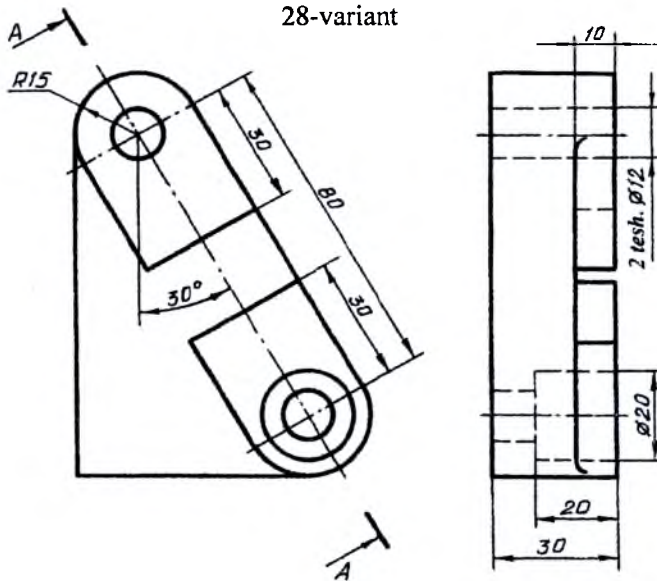
26-variant



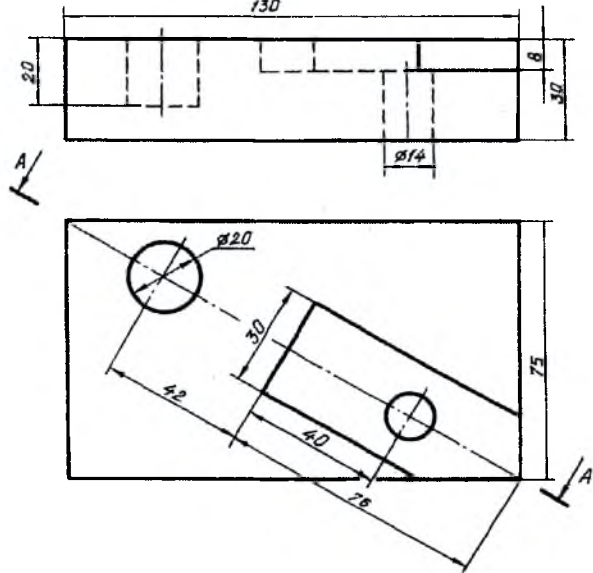
35  
27-variant  
730



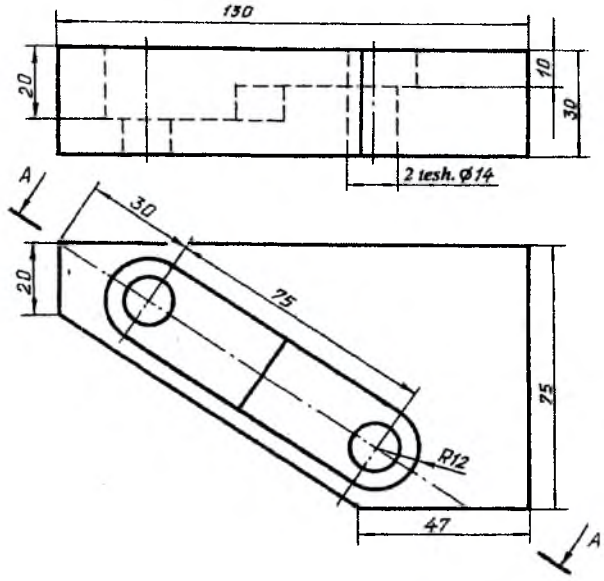
28-variant



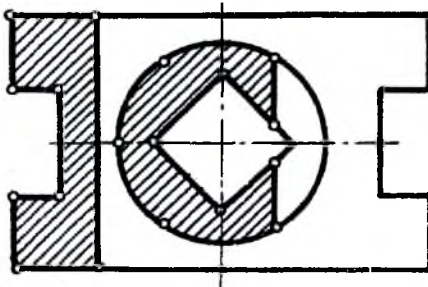
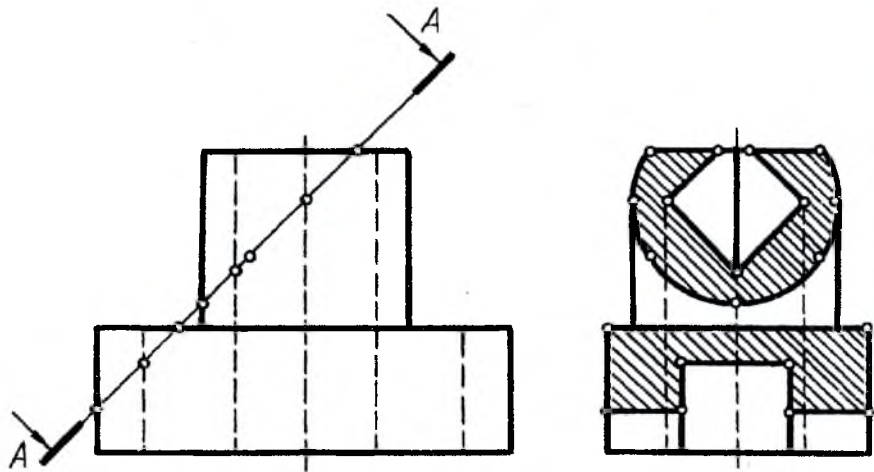
36  
29-variant  
130



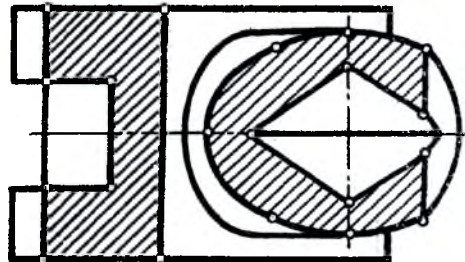
30-variant  
130



Grafik ishlar bajarish bo'yicha na'muna va variantlar

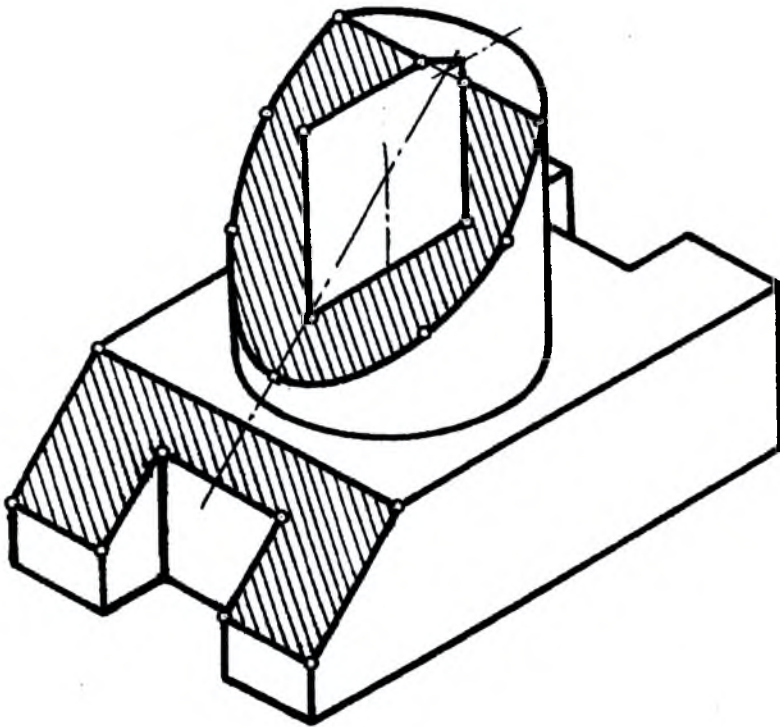


*A-A burilgan*

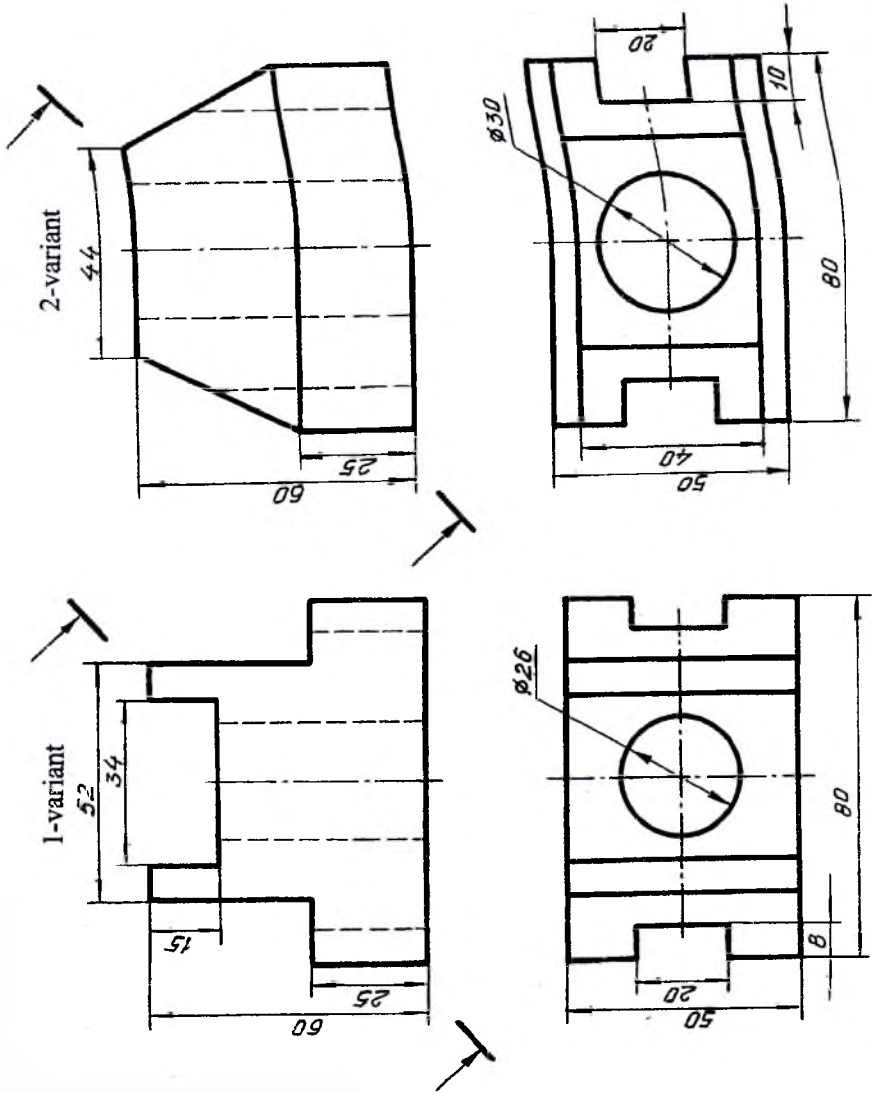


14-shaki

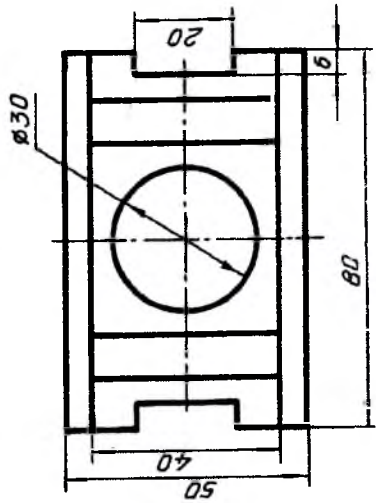
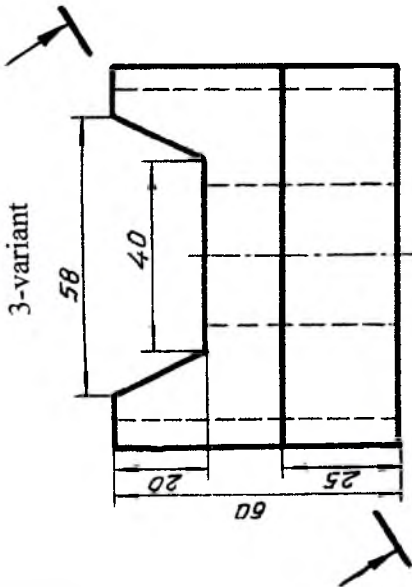
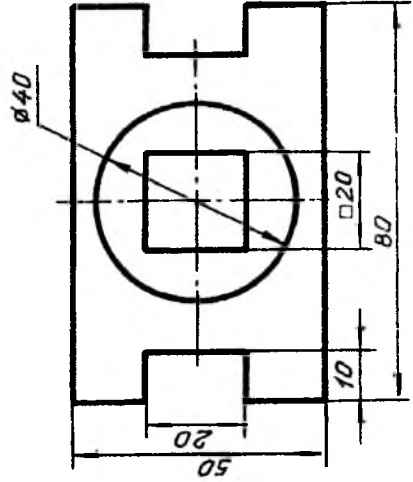
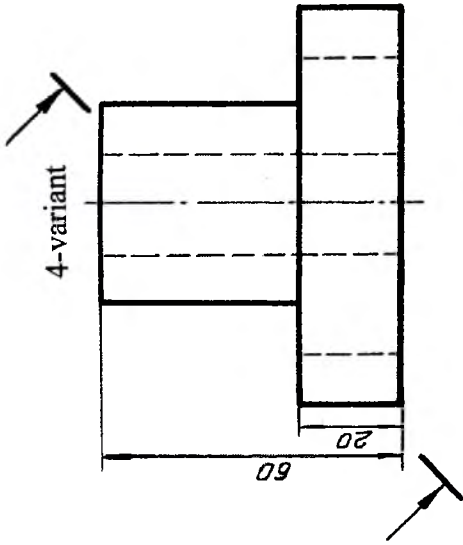
*Izometriya a:b:c=1:1:1*

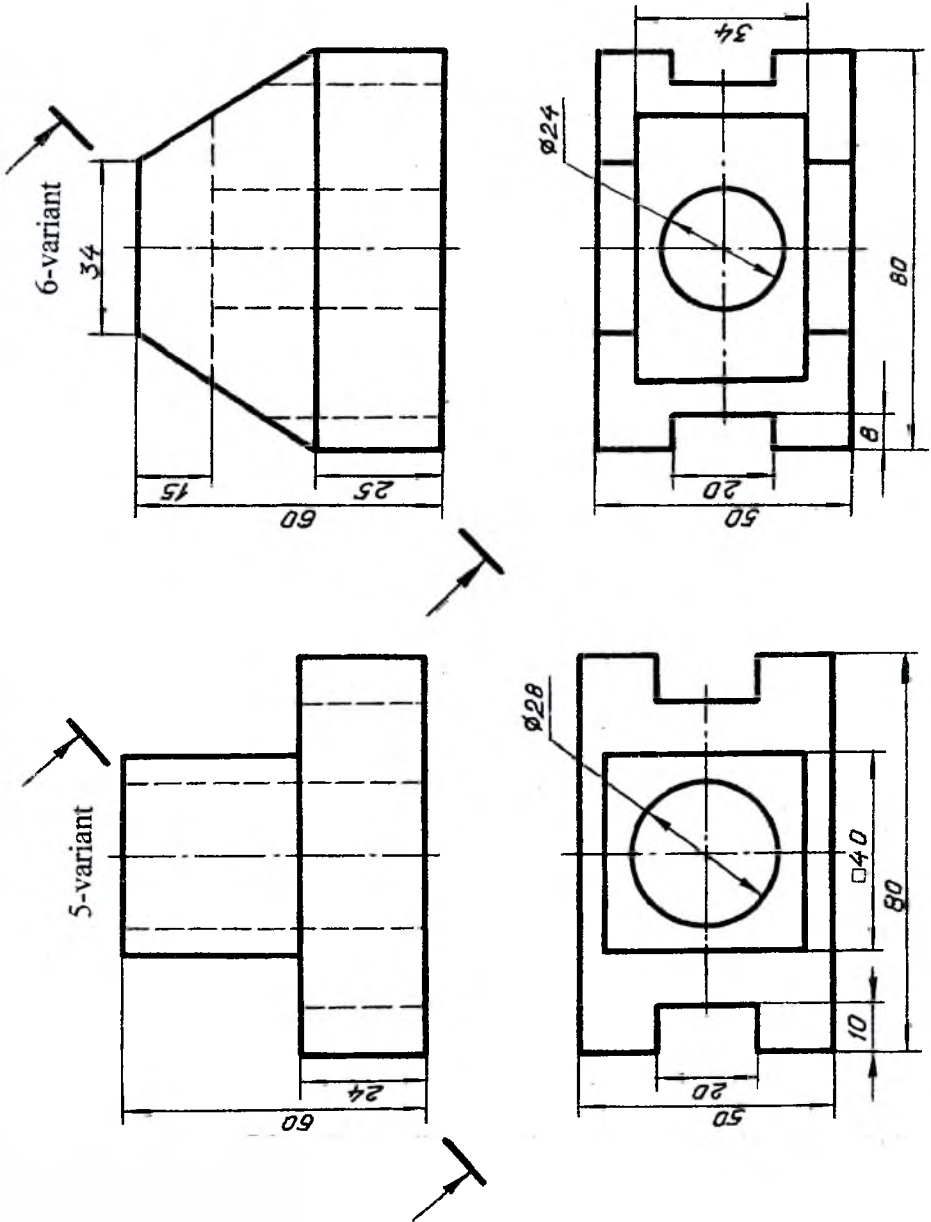


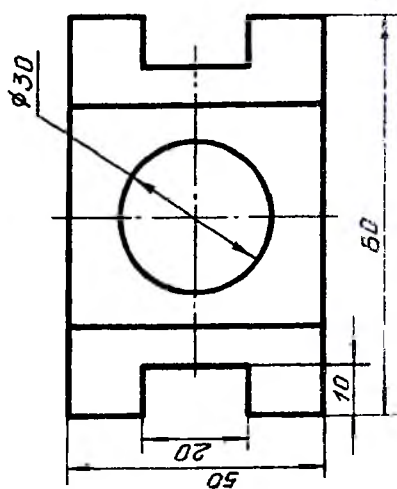
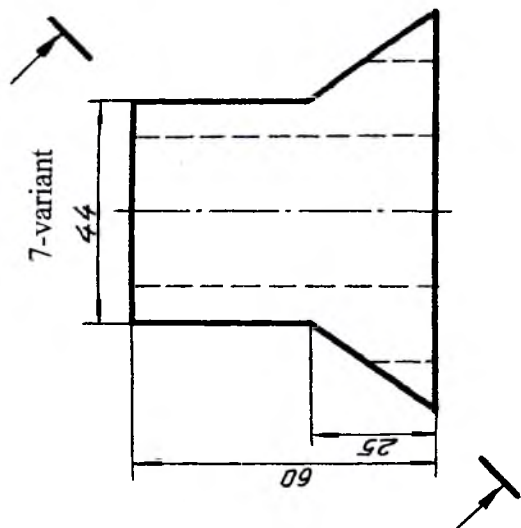
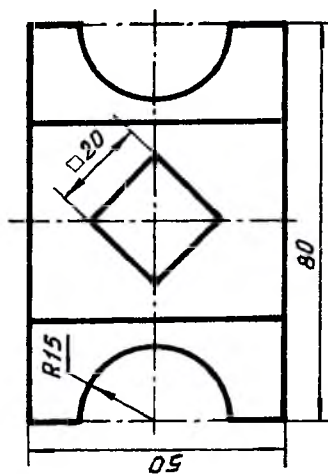
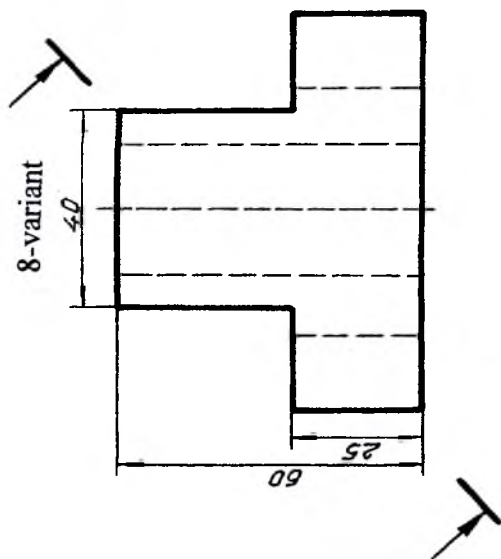
15-shakl

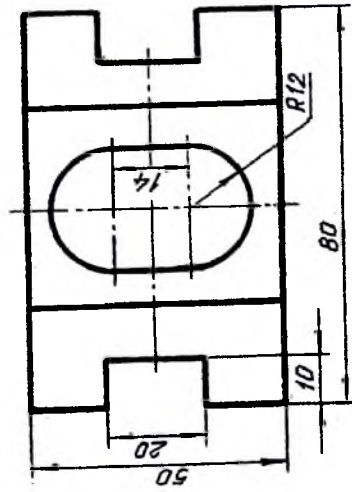
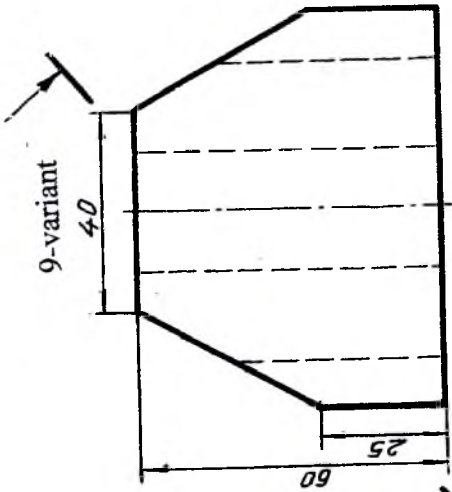
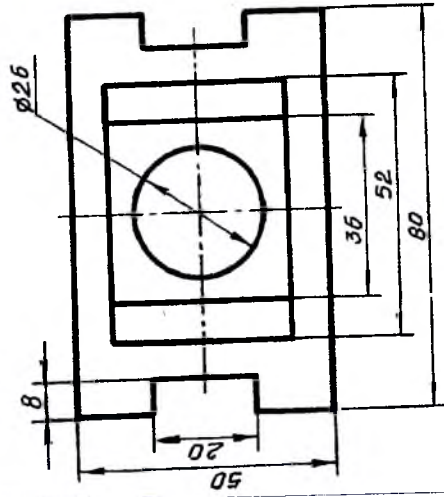
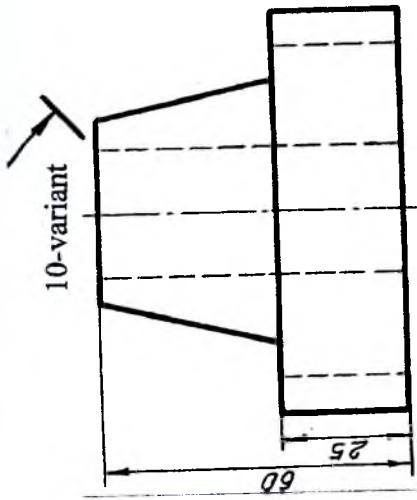


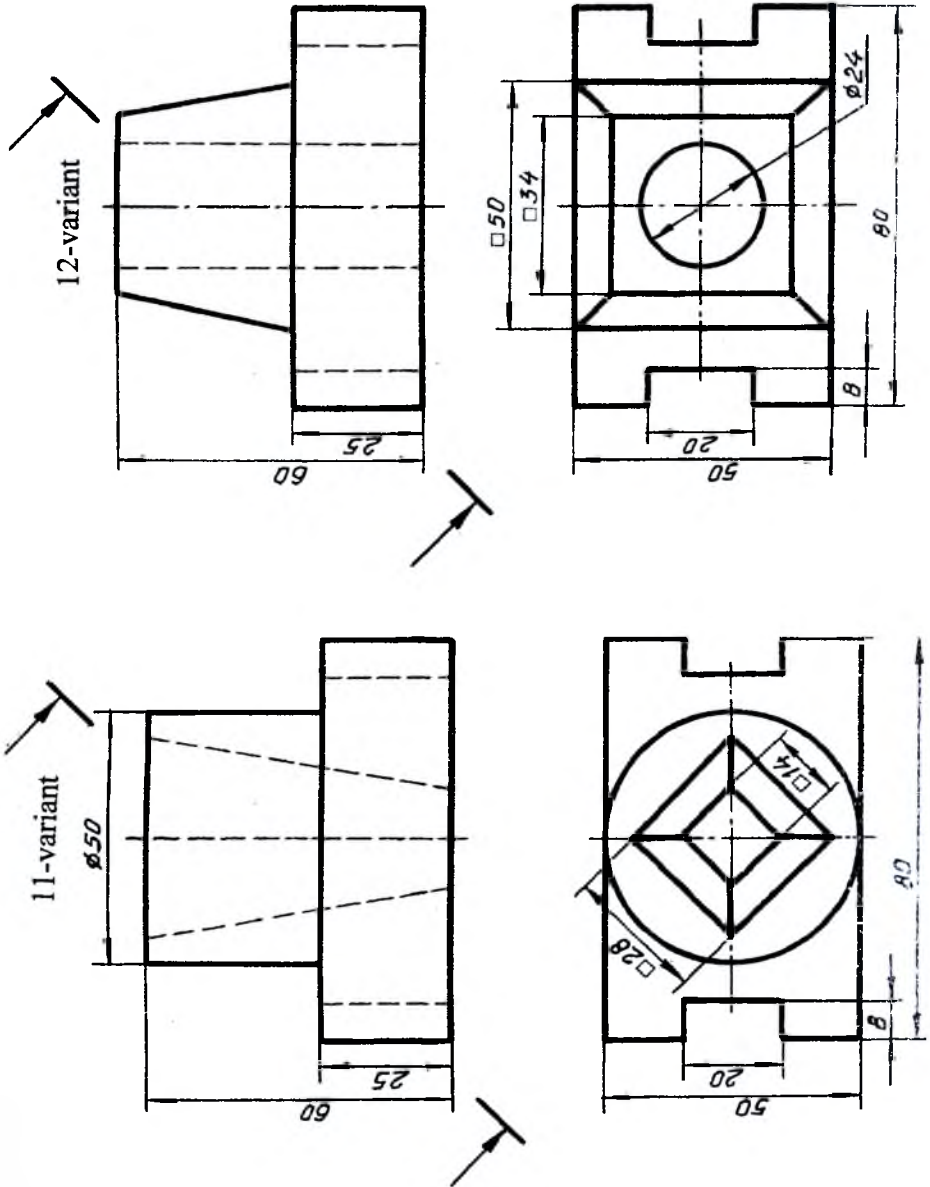


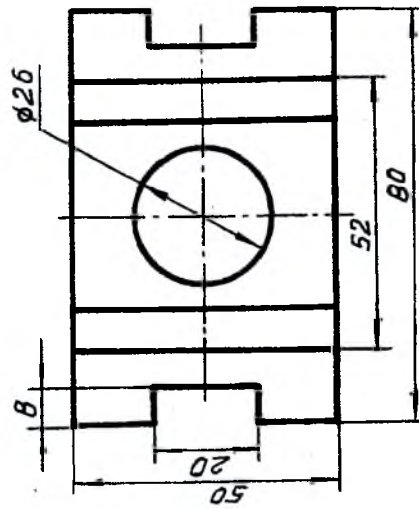
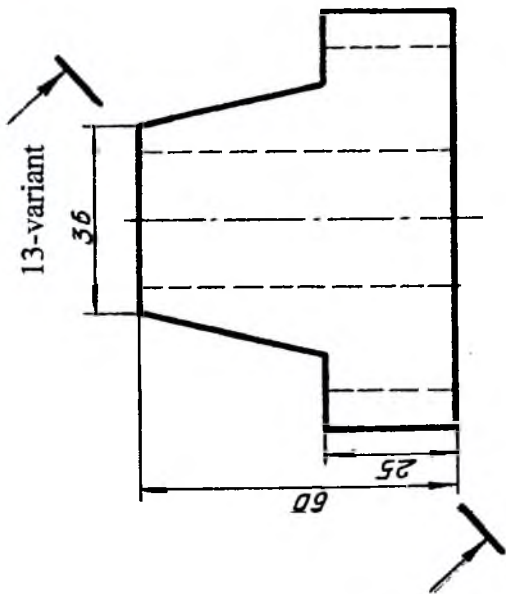
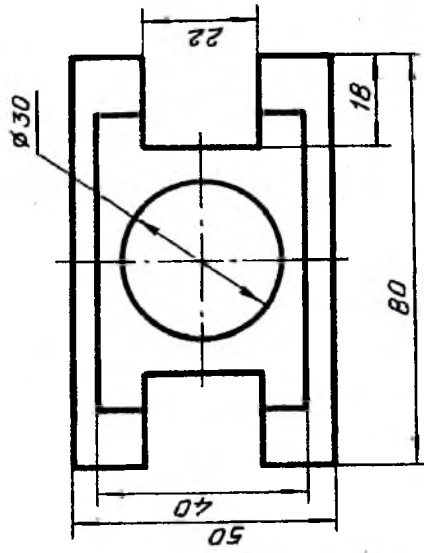
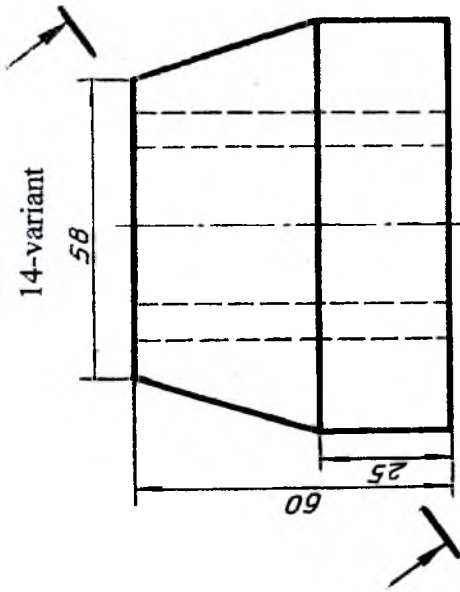


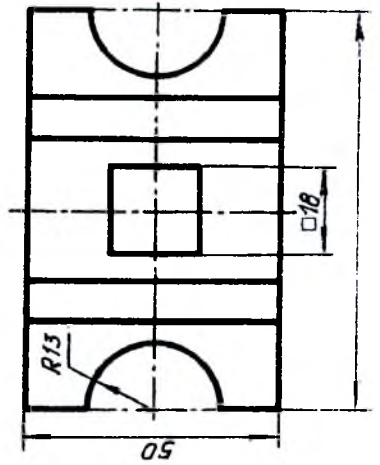
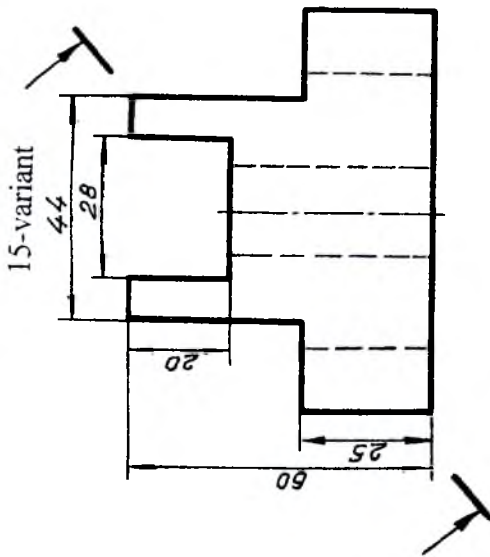
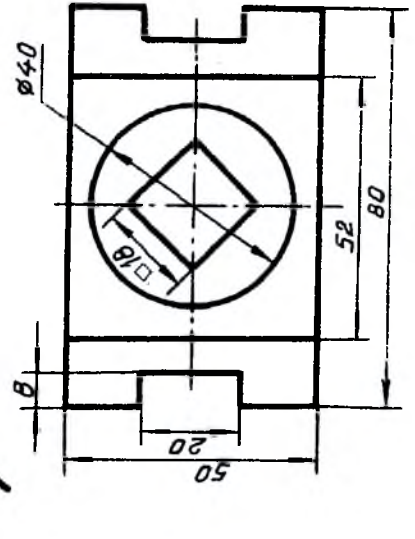
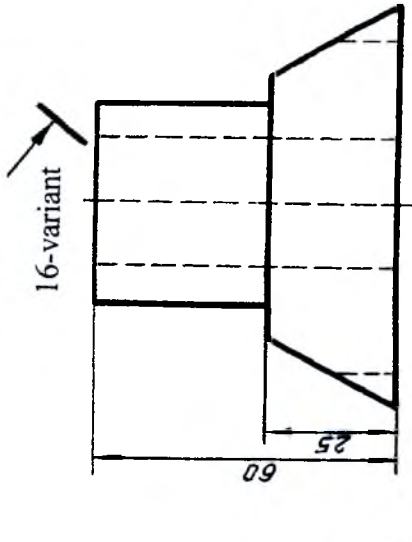




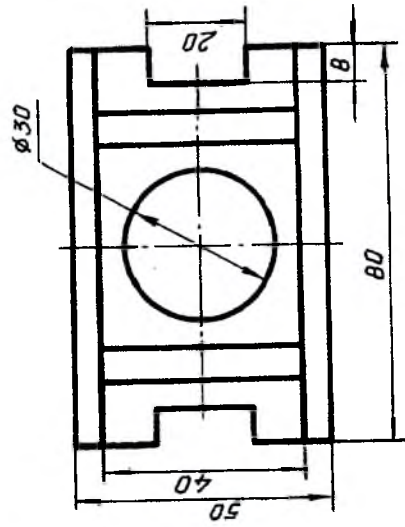
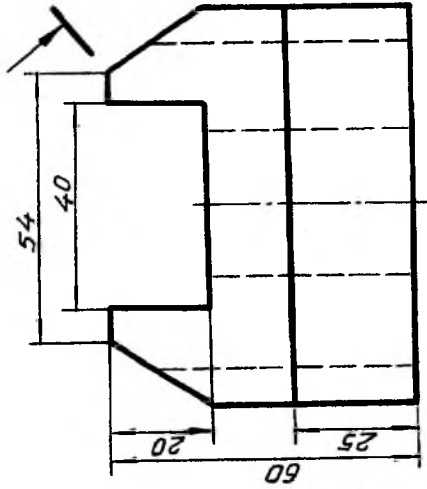




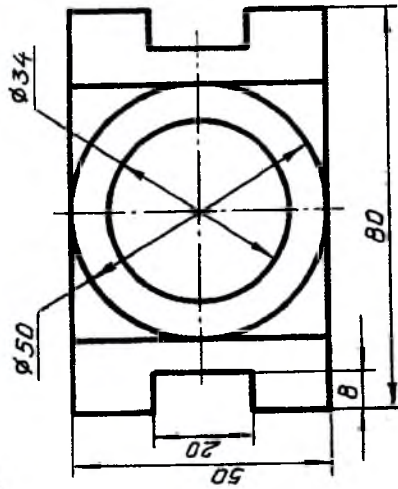
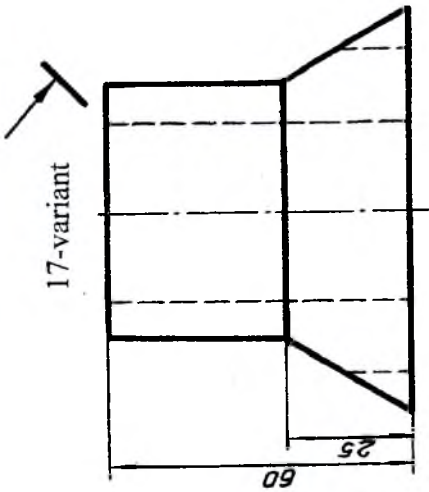




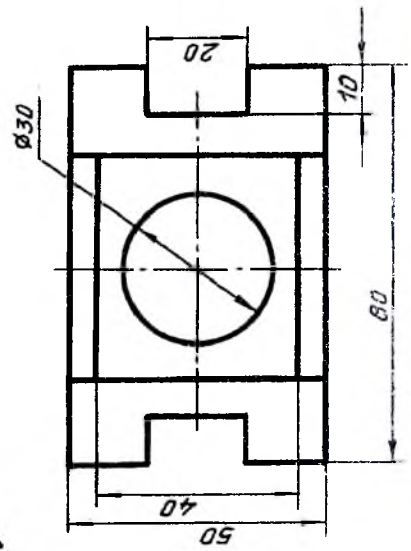
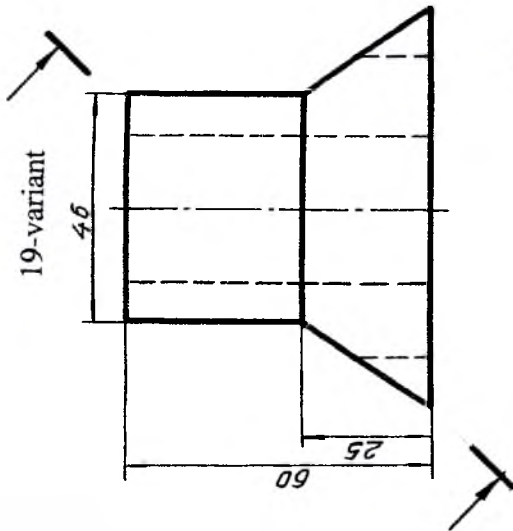
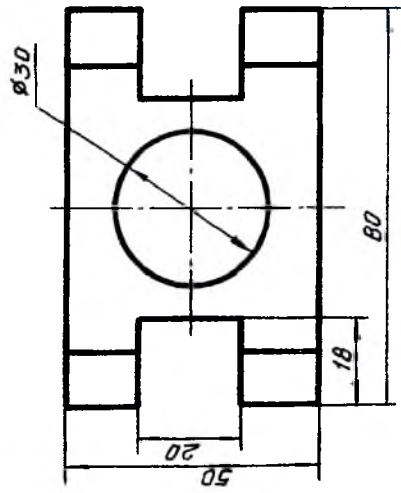
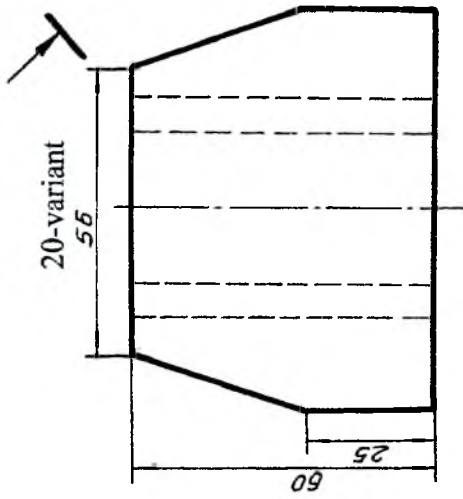
18-variant

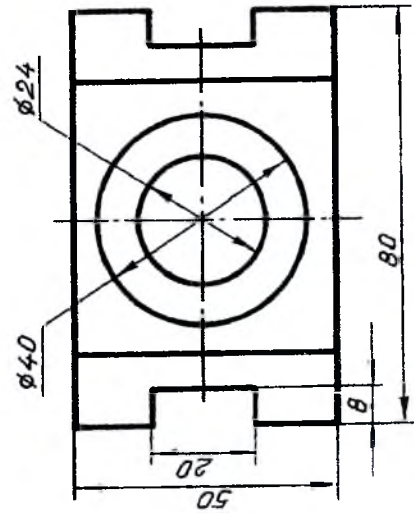
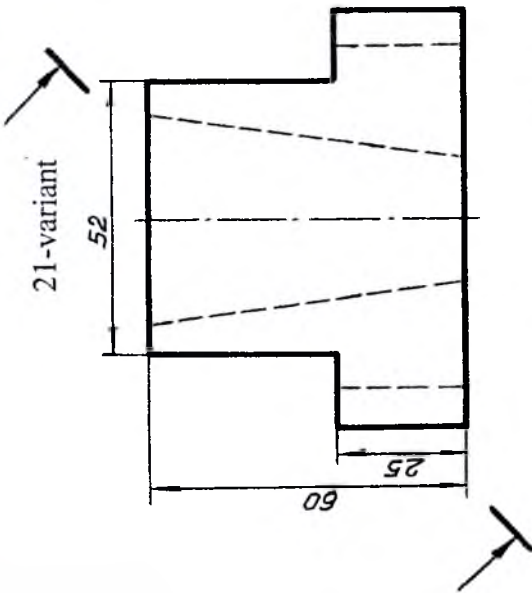
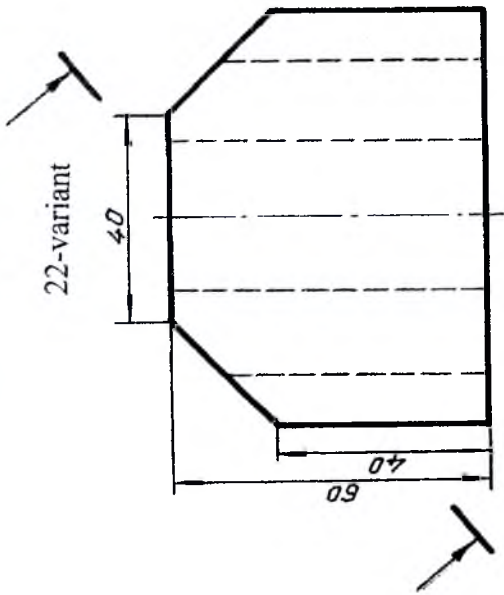


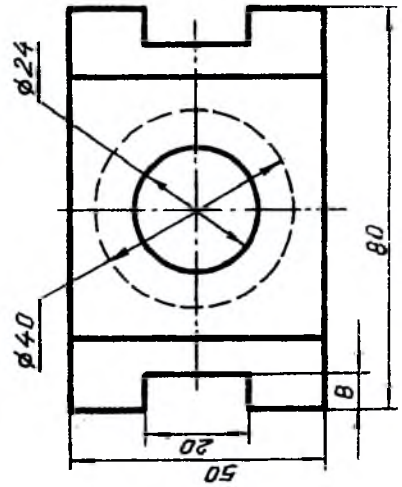
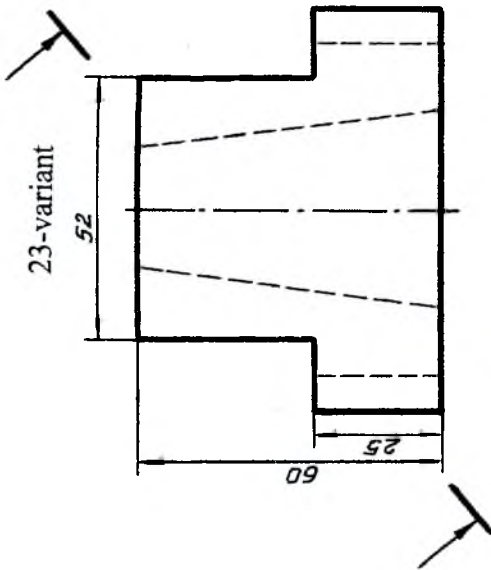
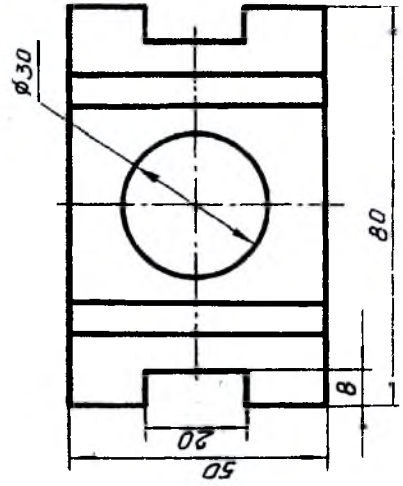
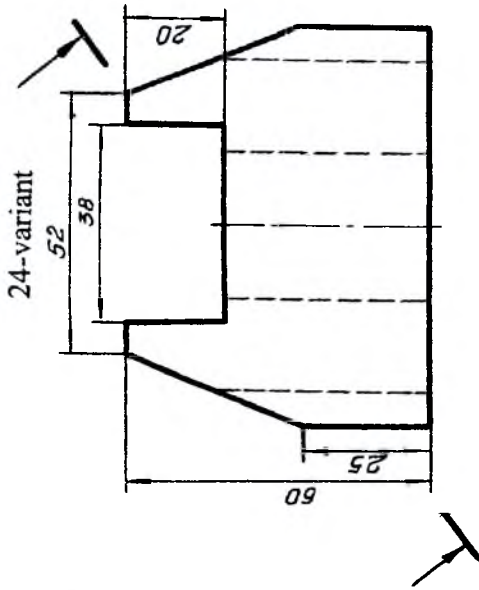
17-variant

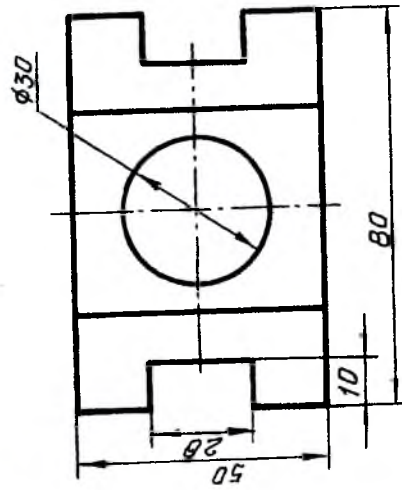
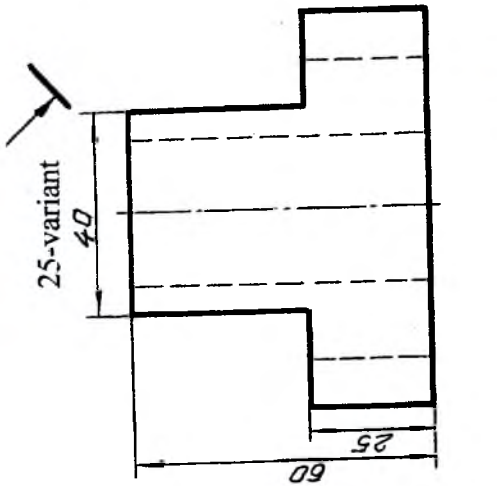
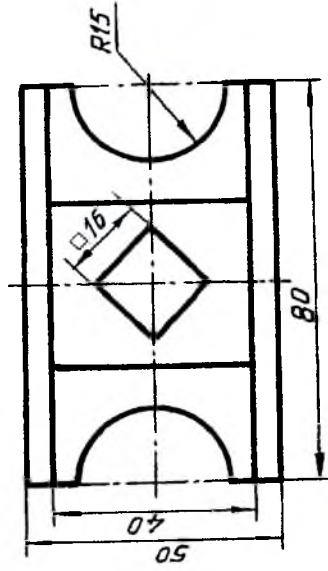
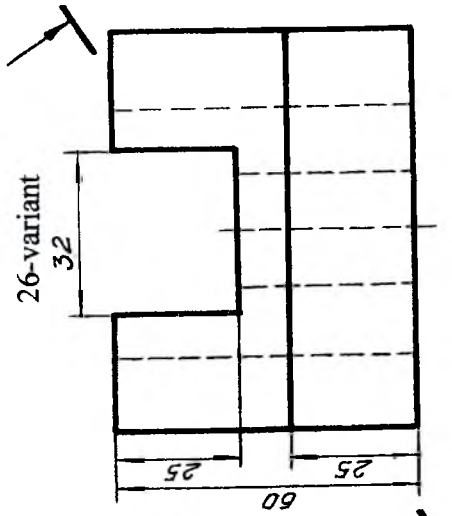


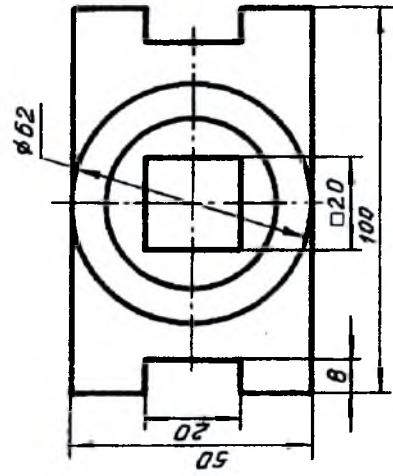
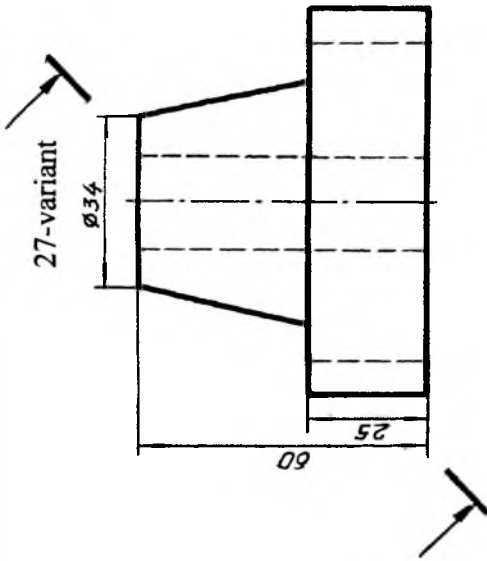
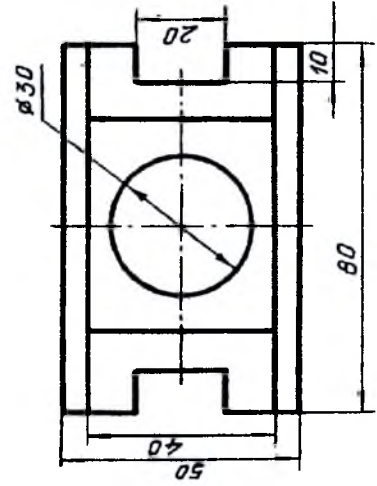
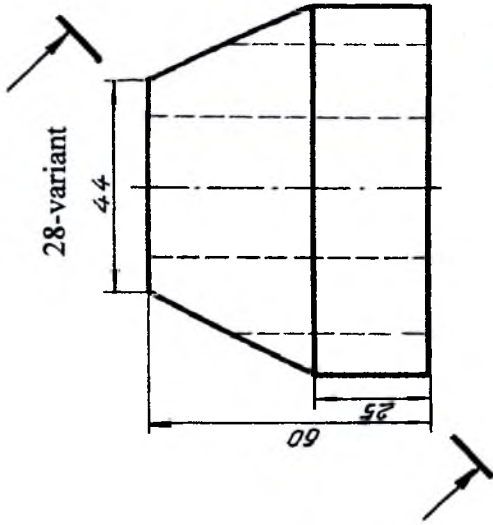


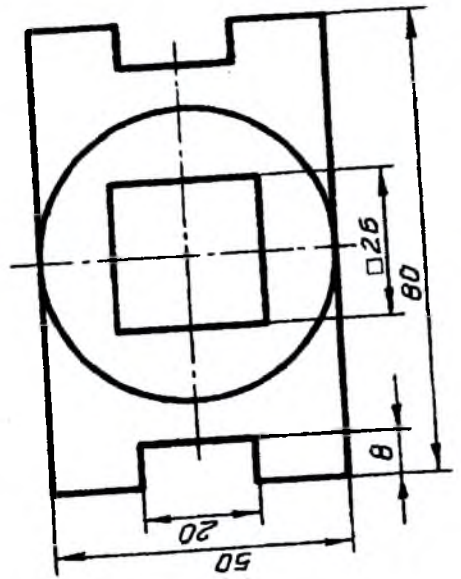
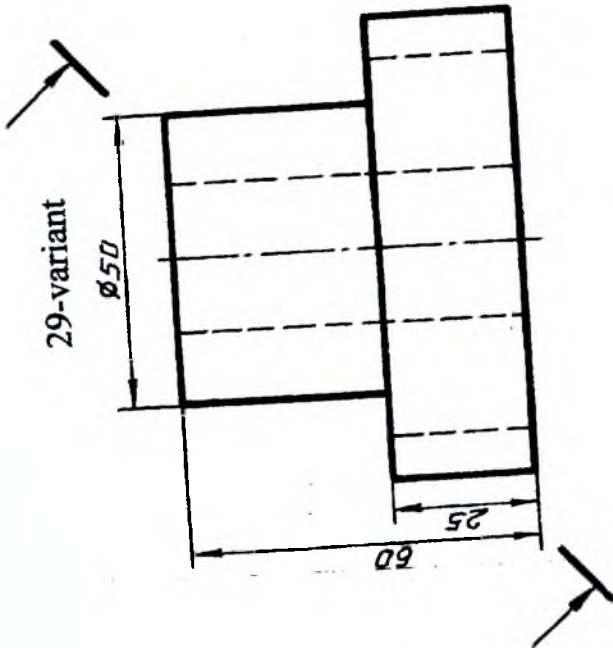
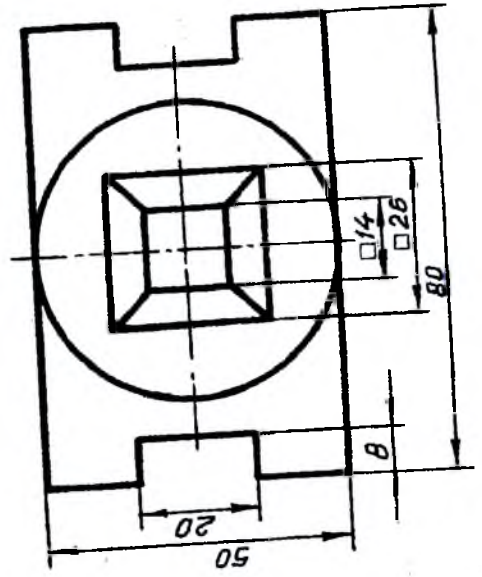
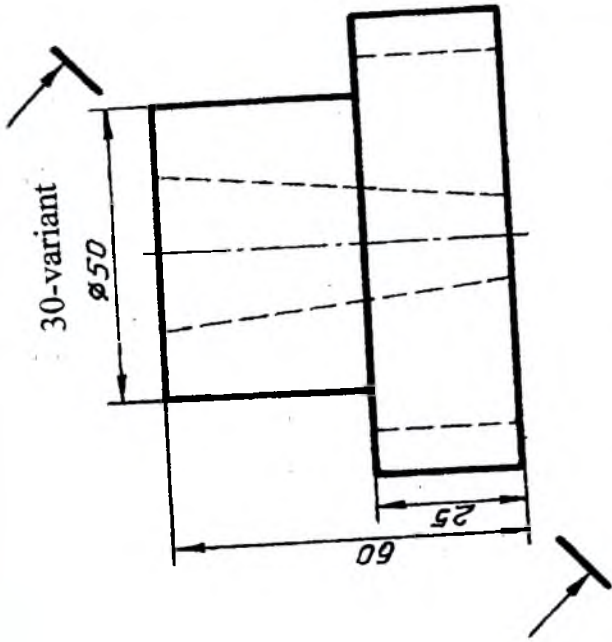


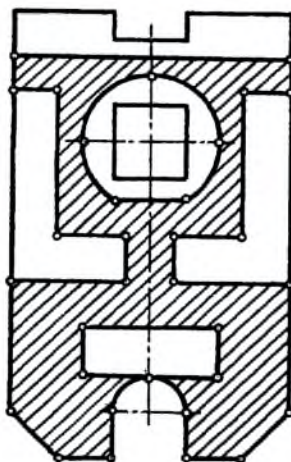
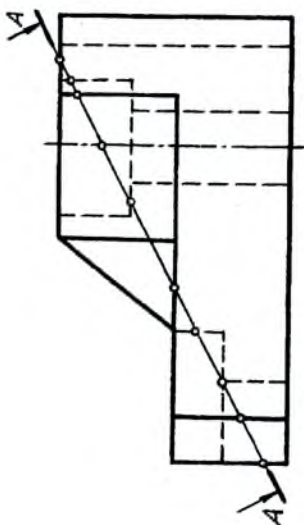
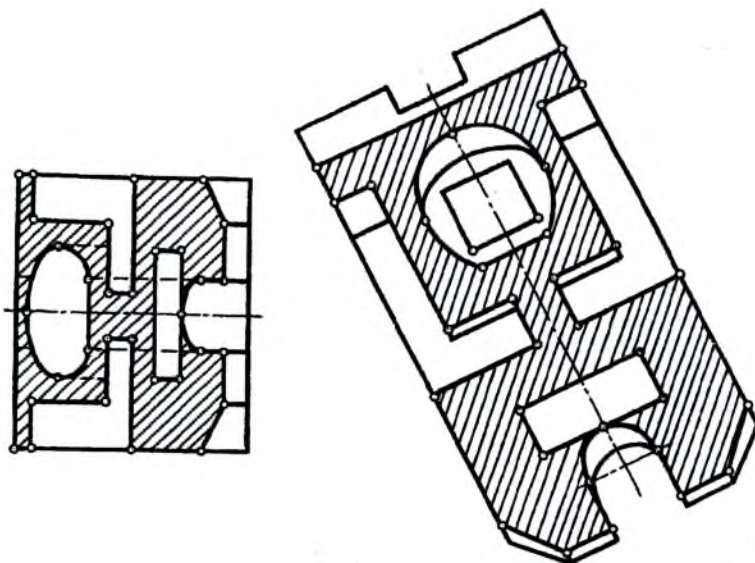






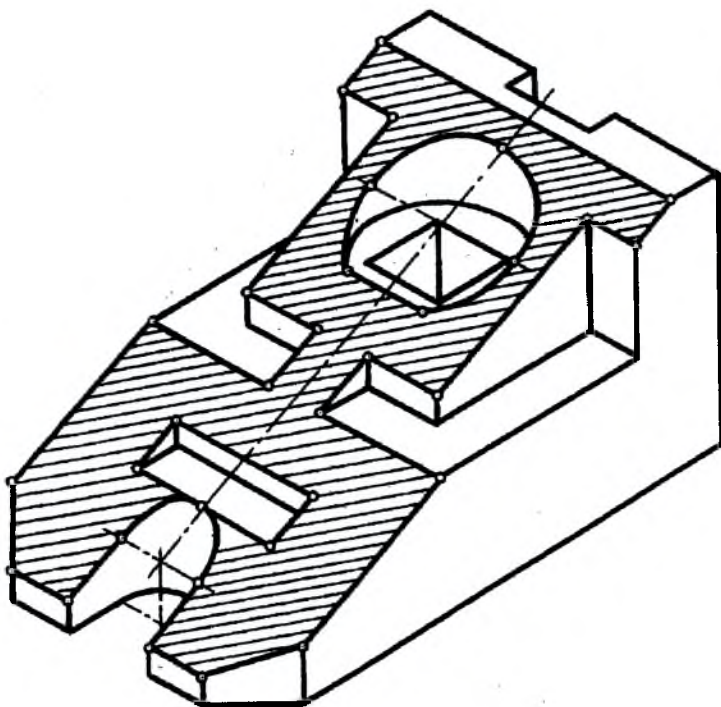






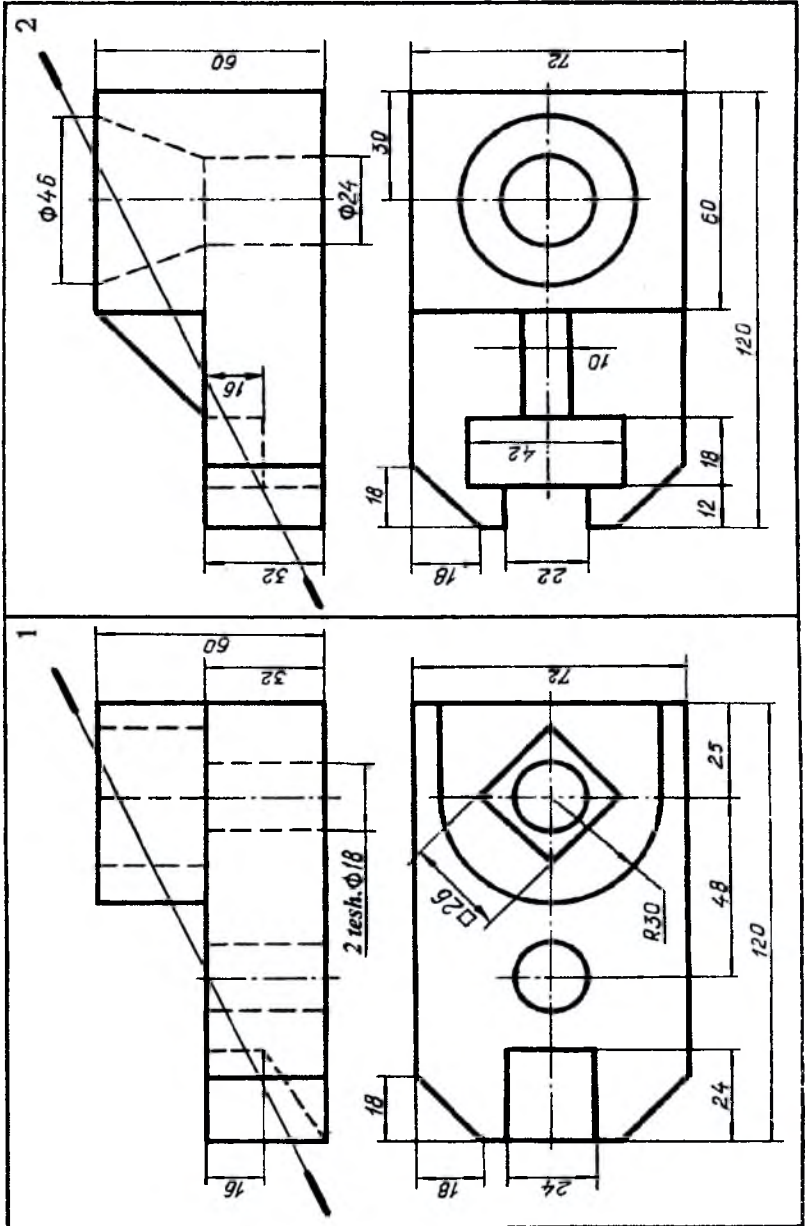
16-shaki

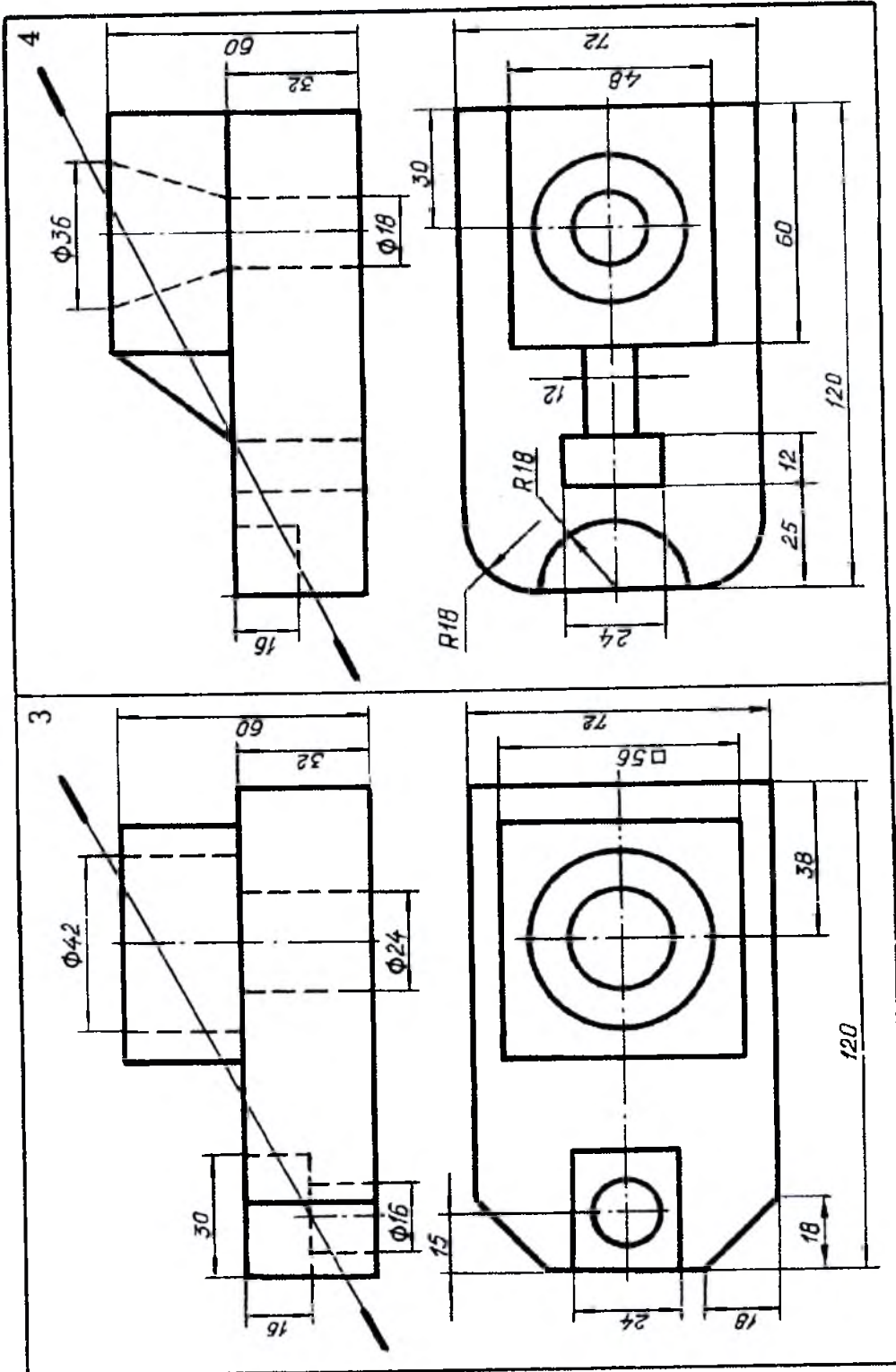
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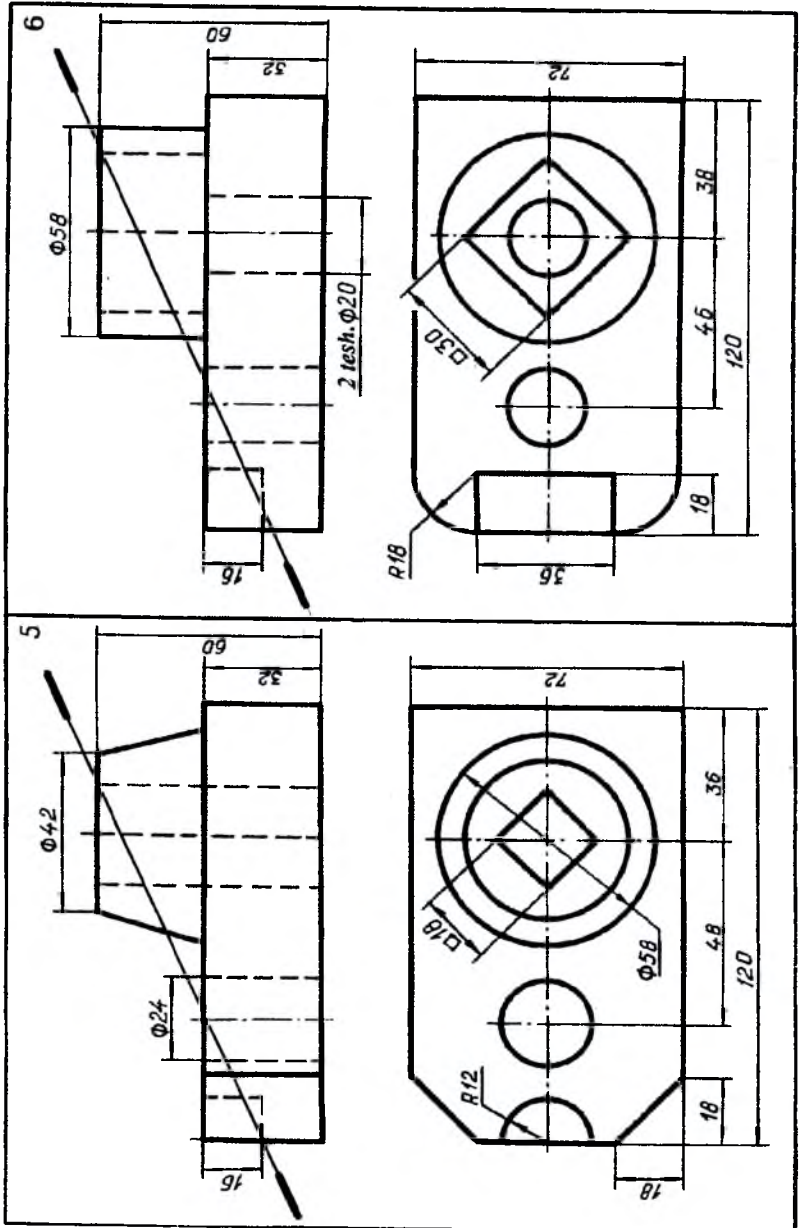


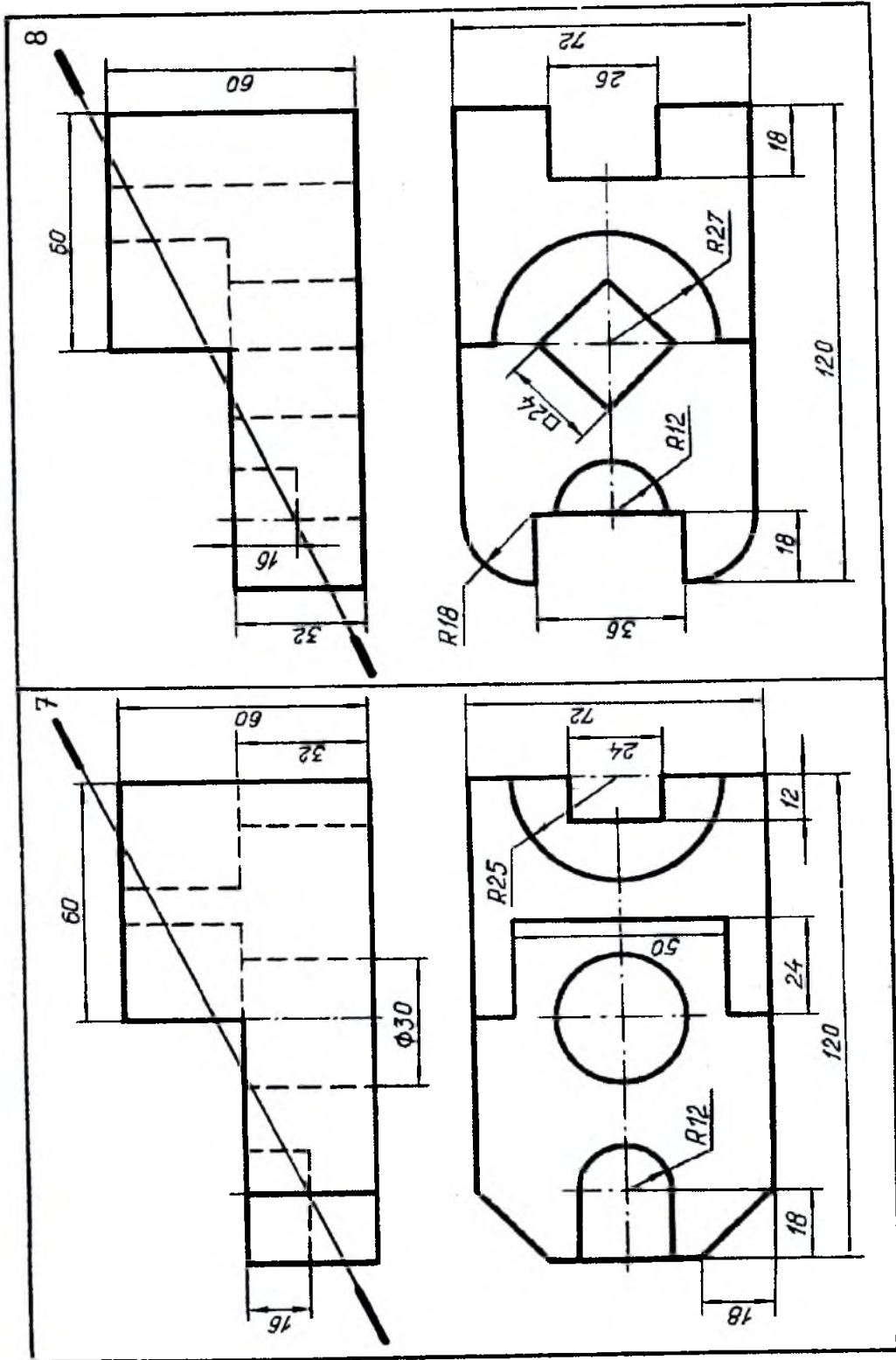
17-shakl

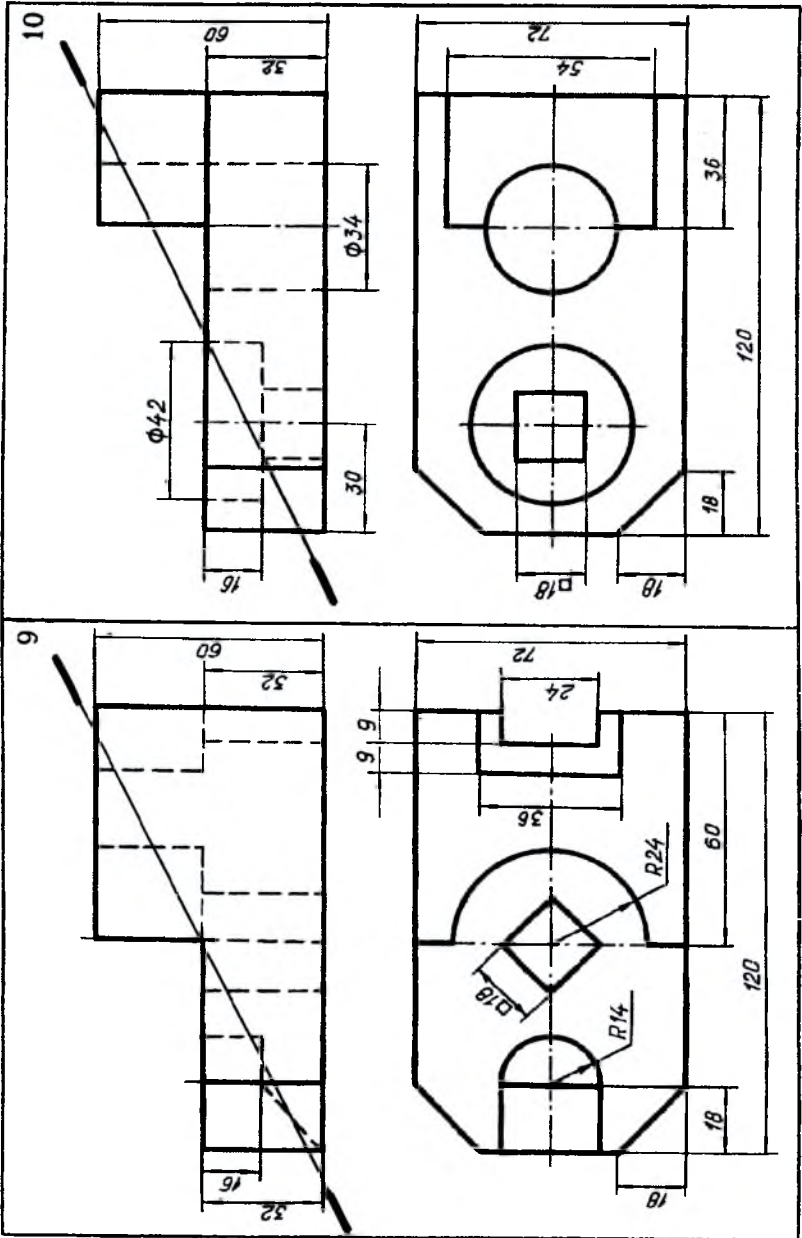


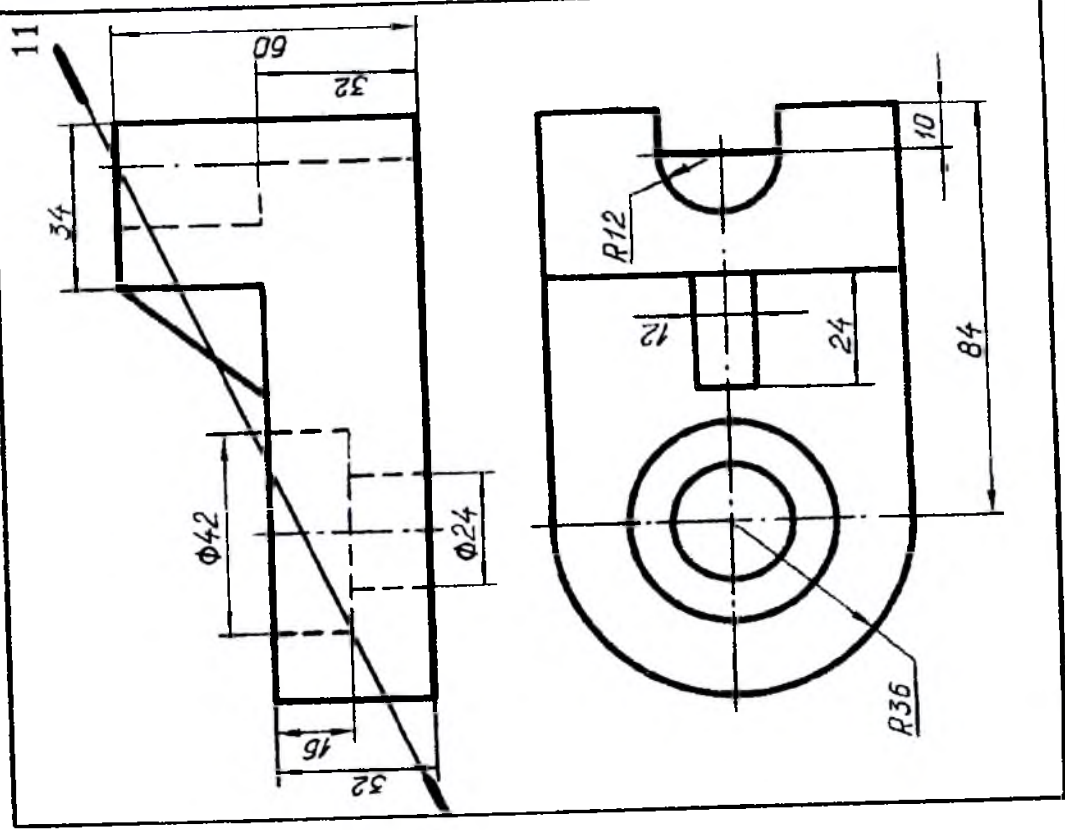
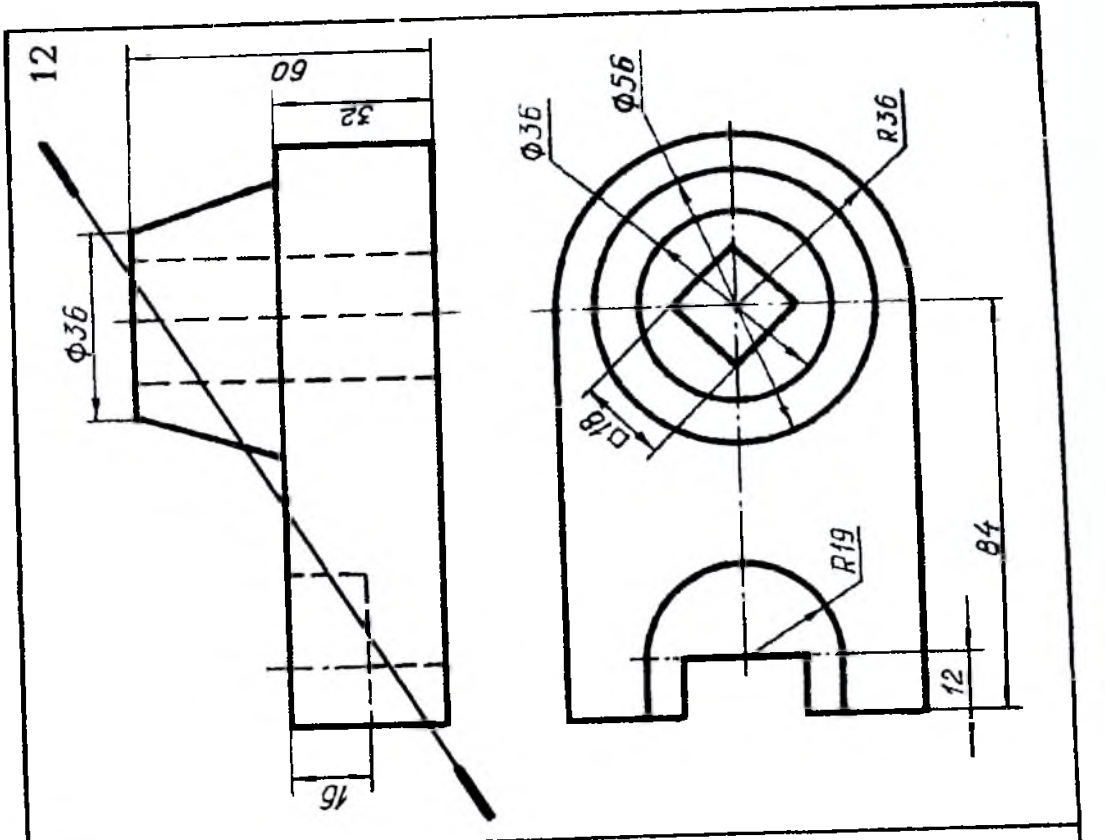


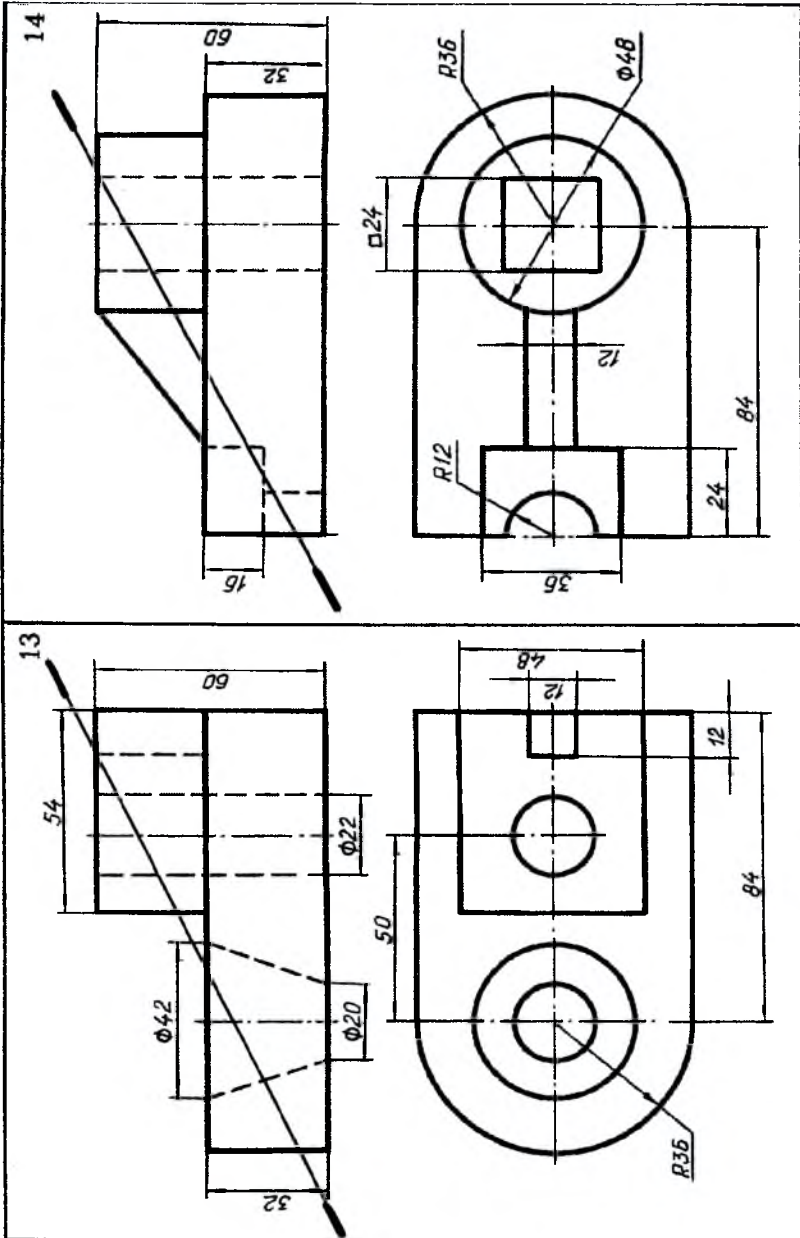


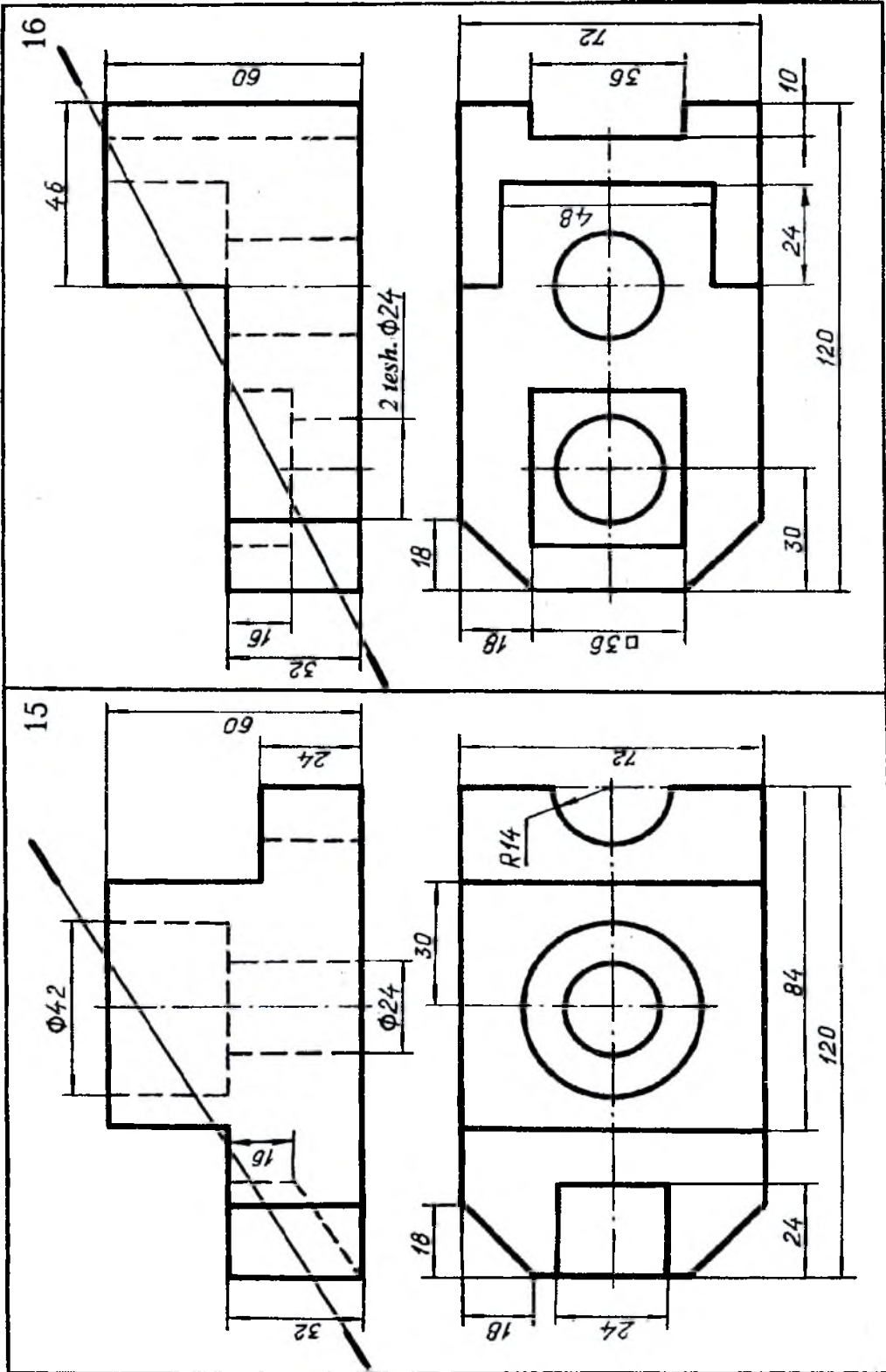




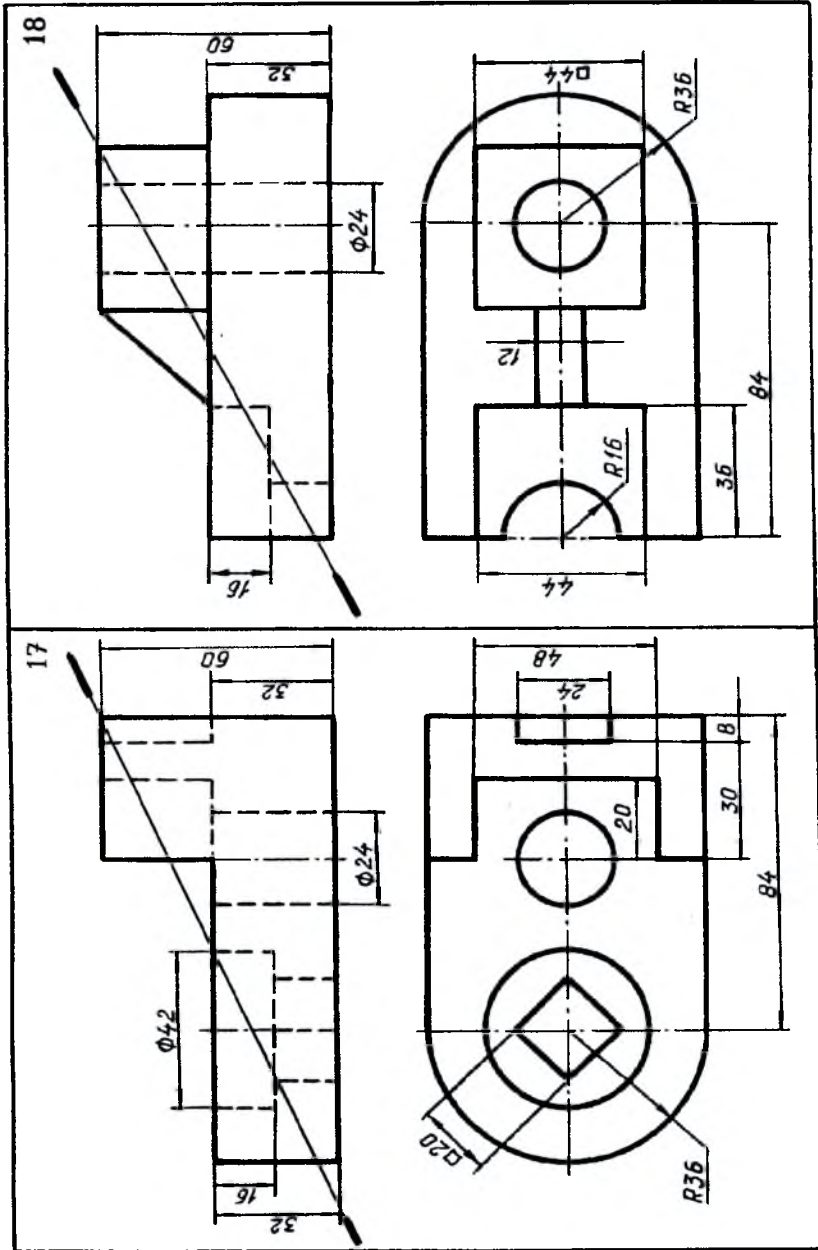


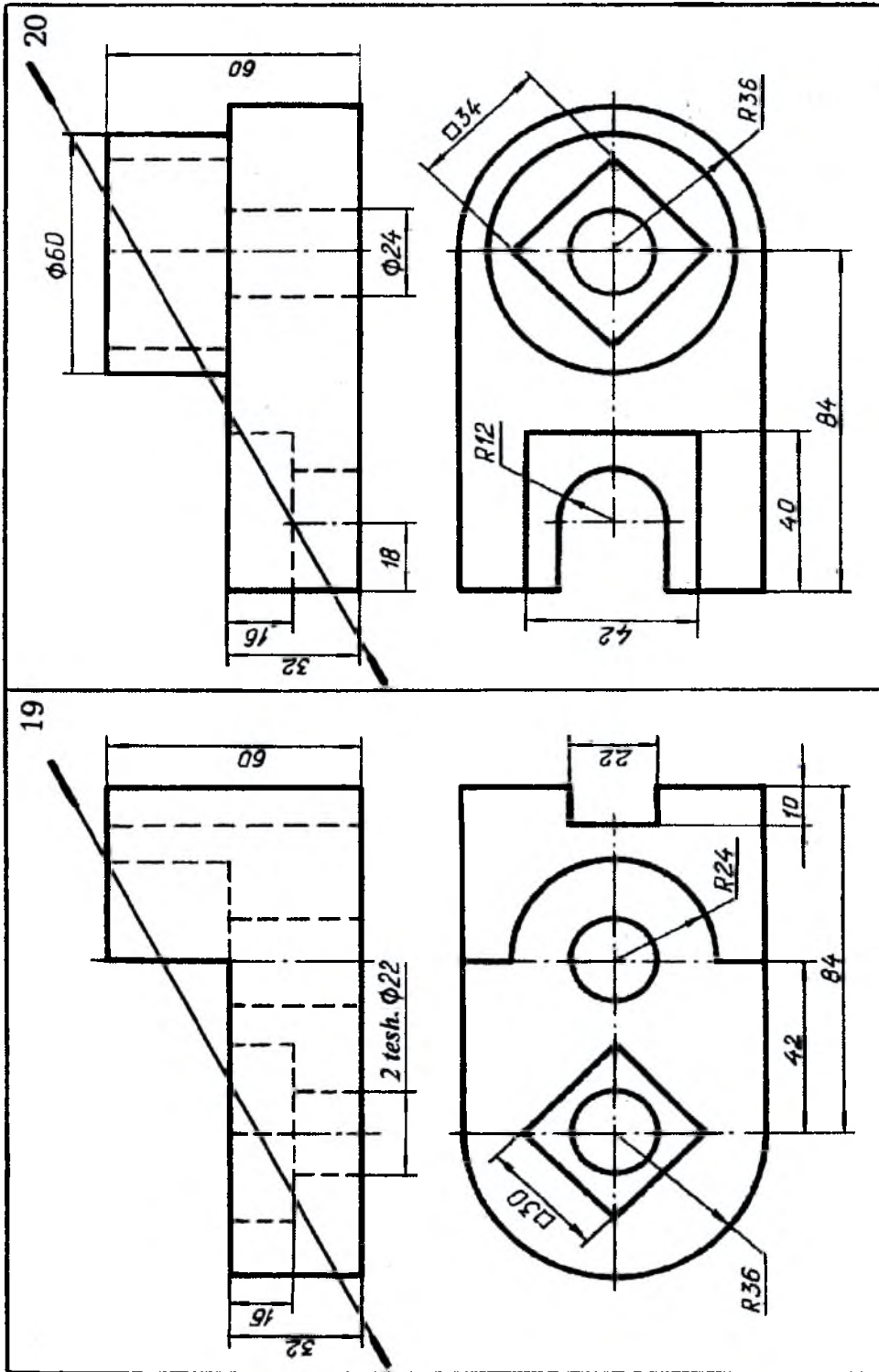


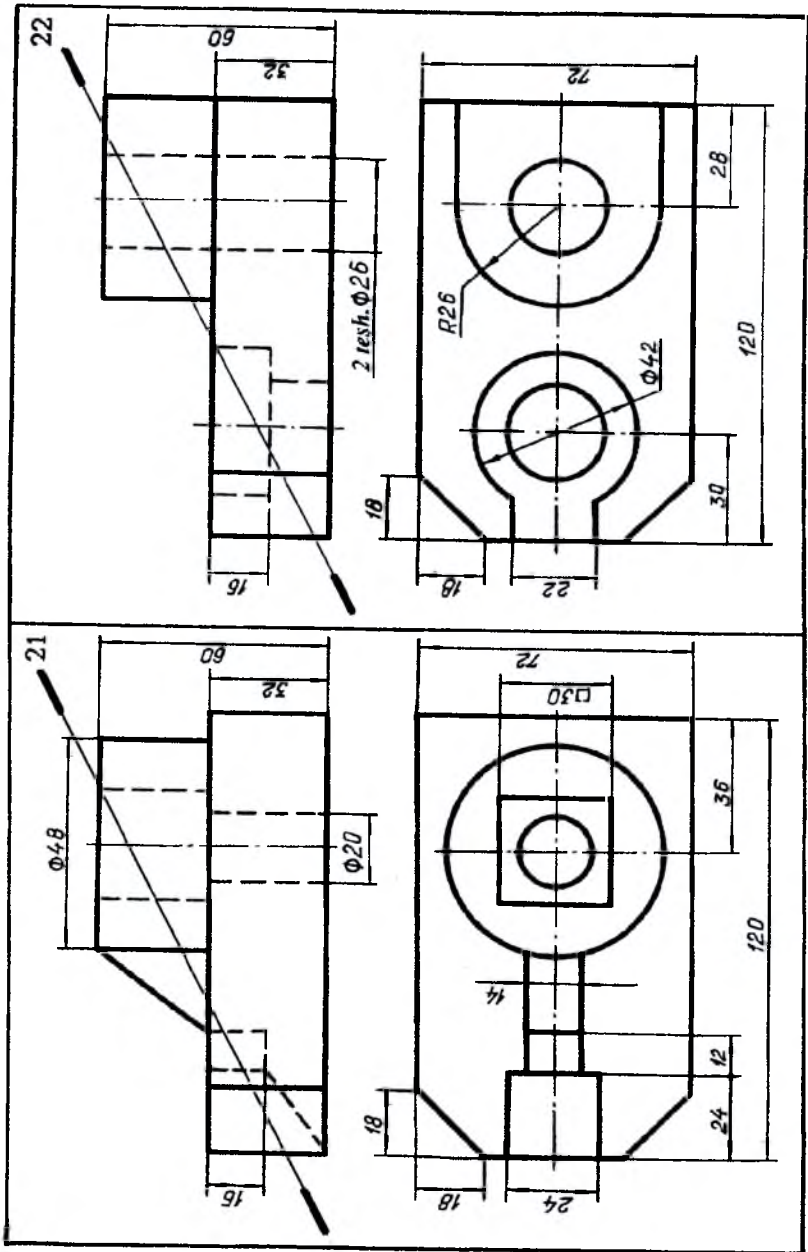


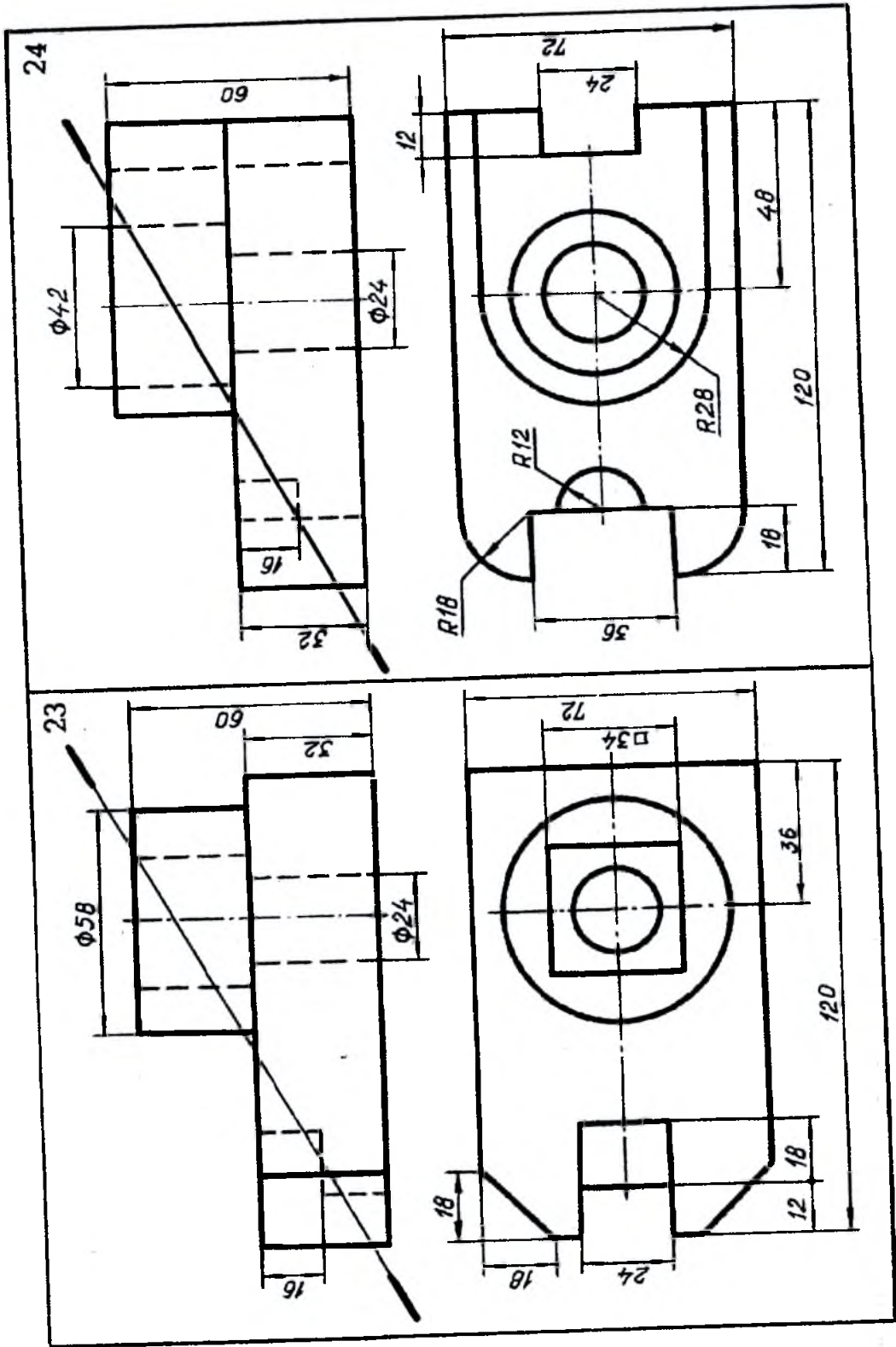


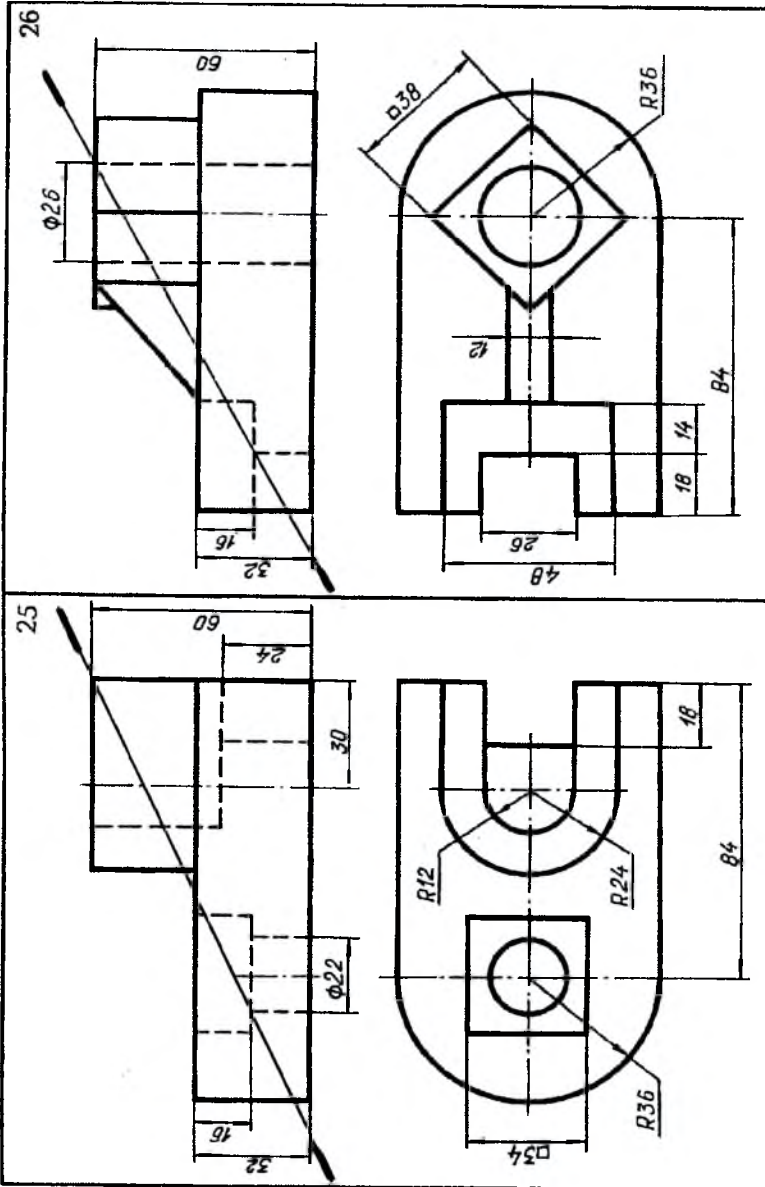


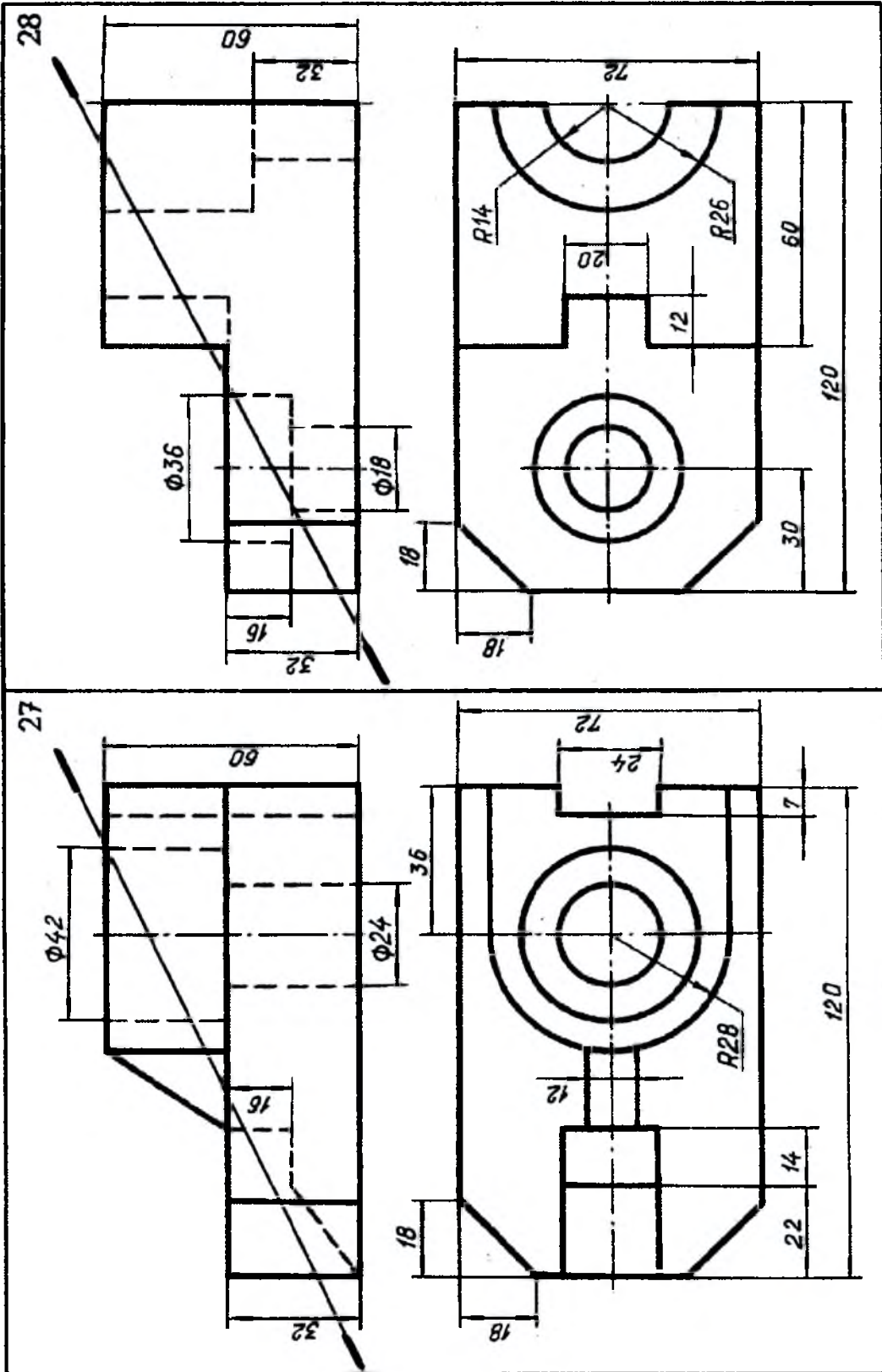


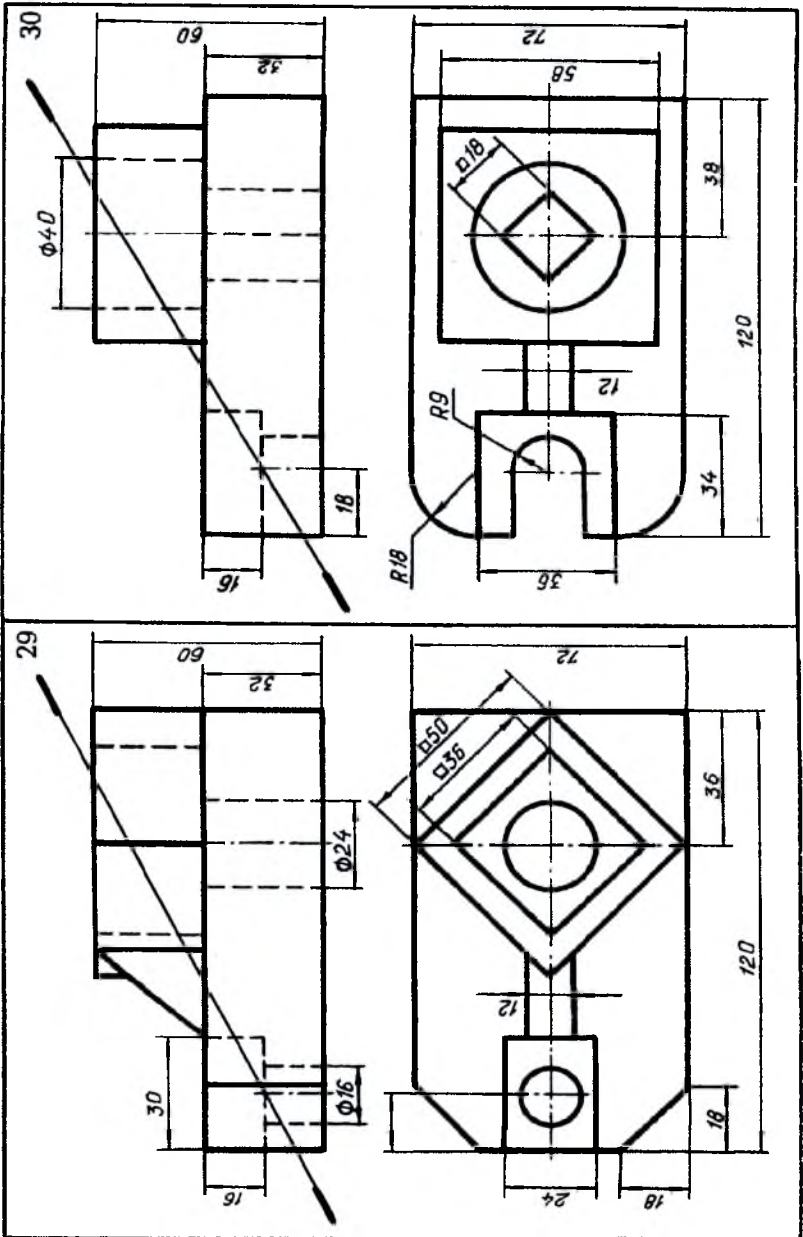




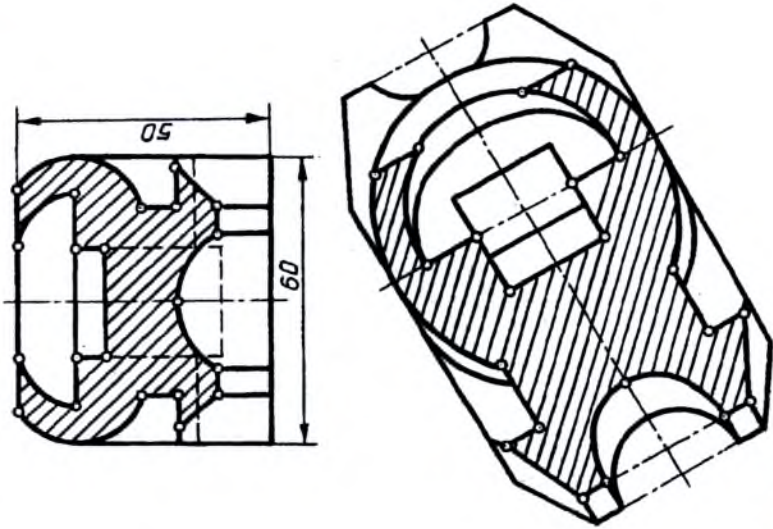




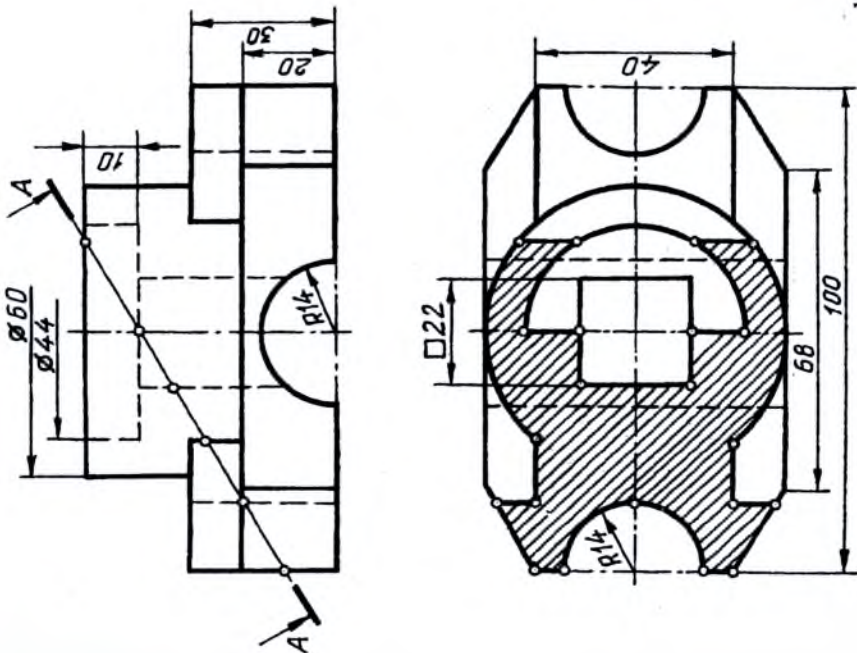




Grafik ishlar bajarish bo'yicha na'muna va variantlar

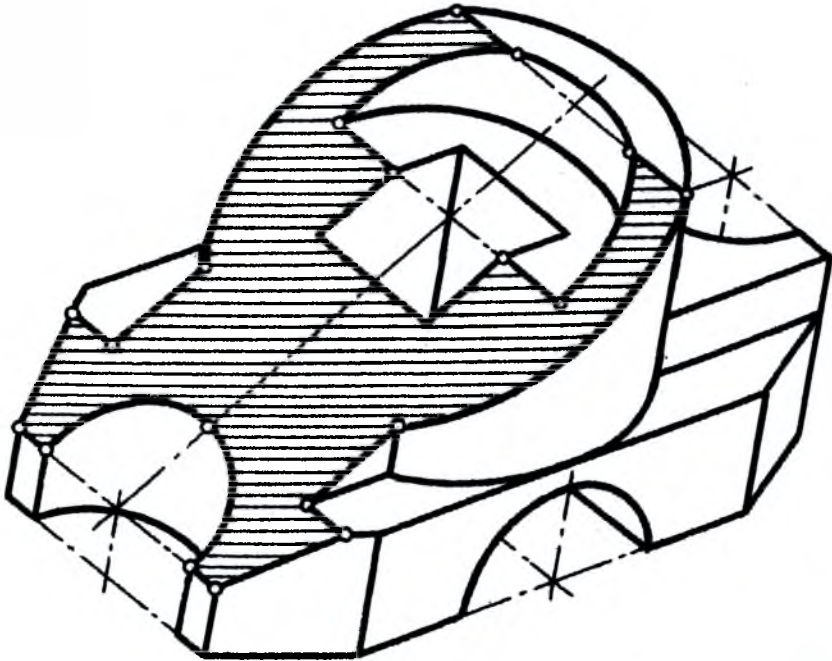


18-shakl



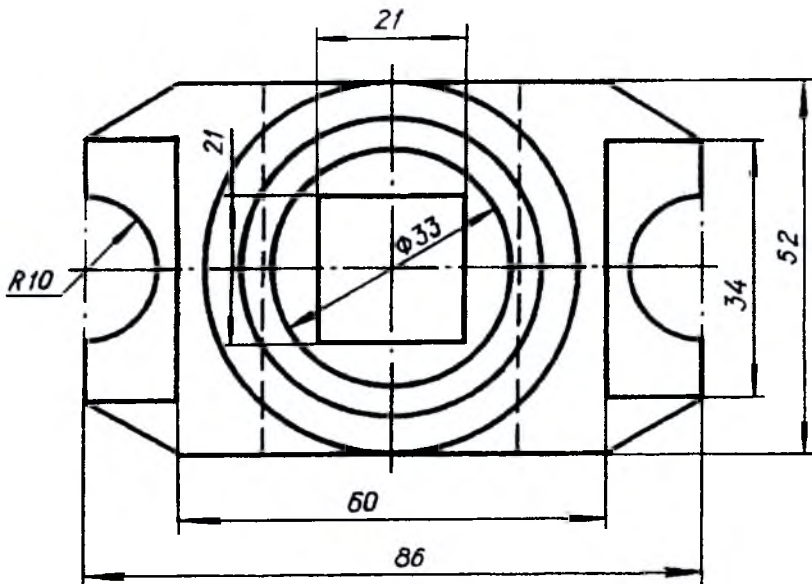
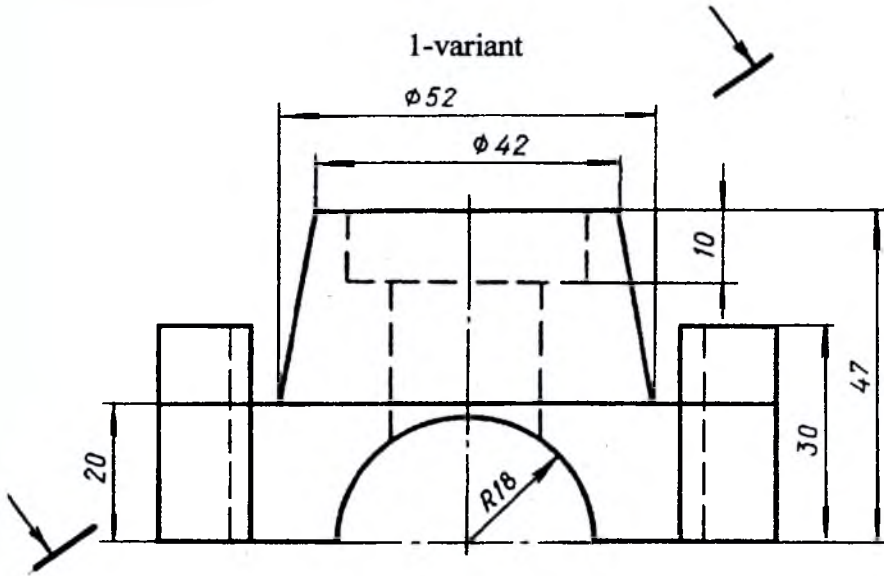


Izometriya  $a:b:c=1:1:1$

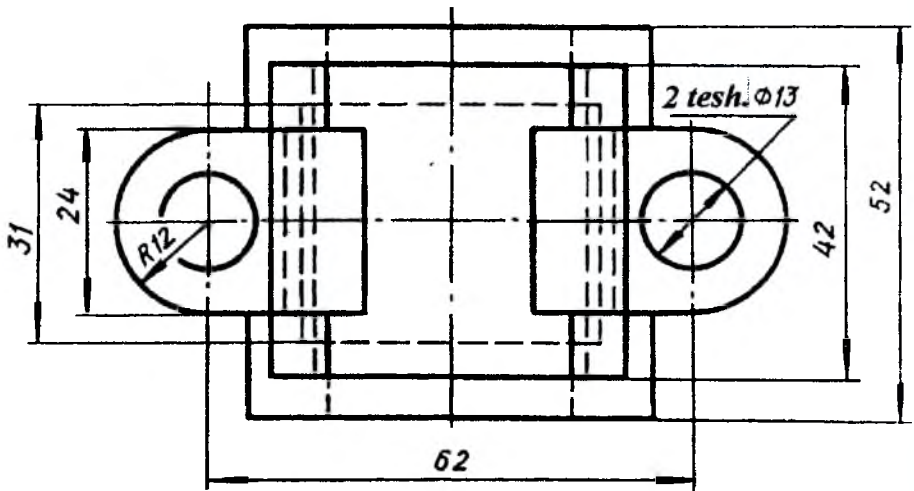
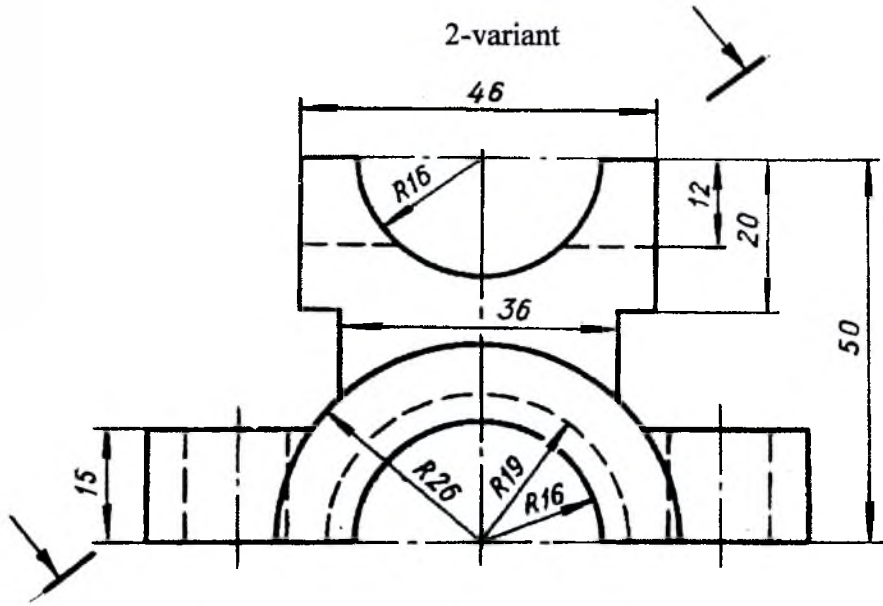


19.-shakl

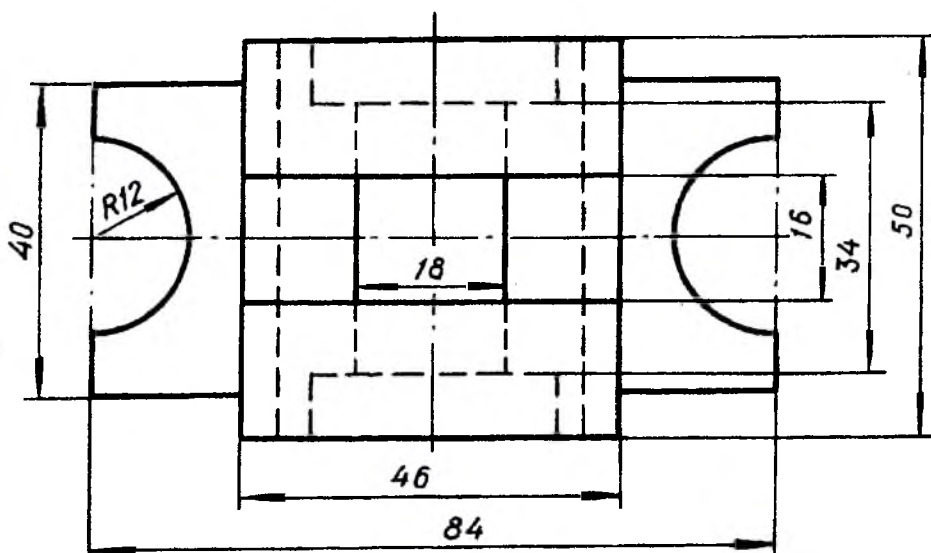
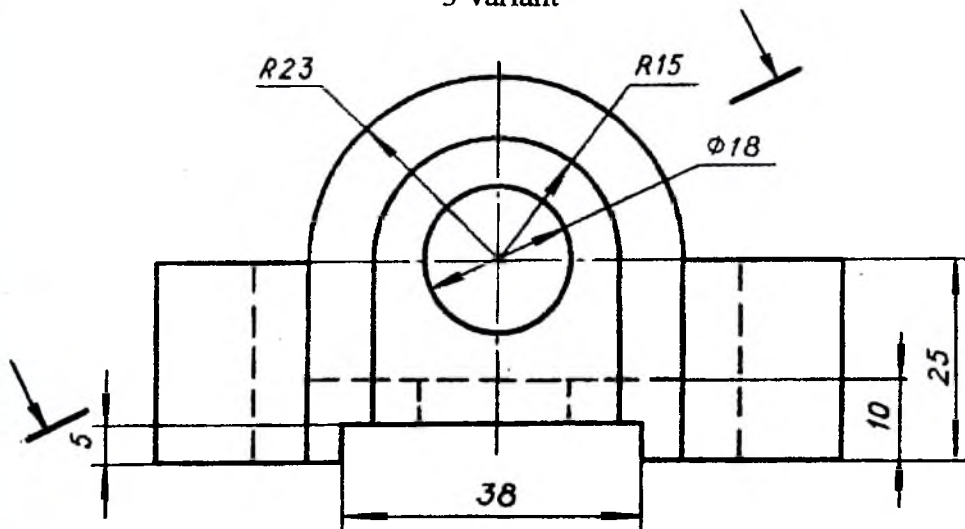
1-variant



2-variant

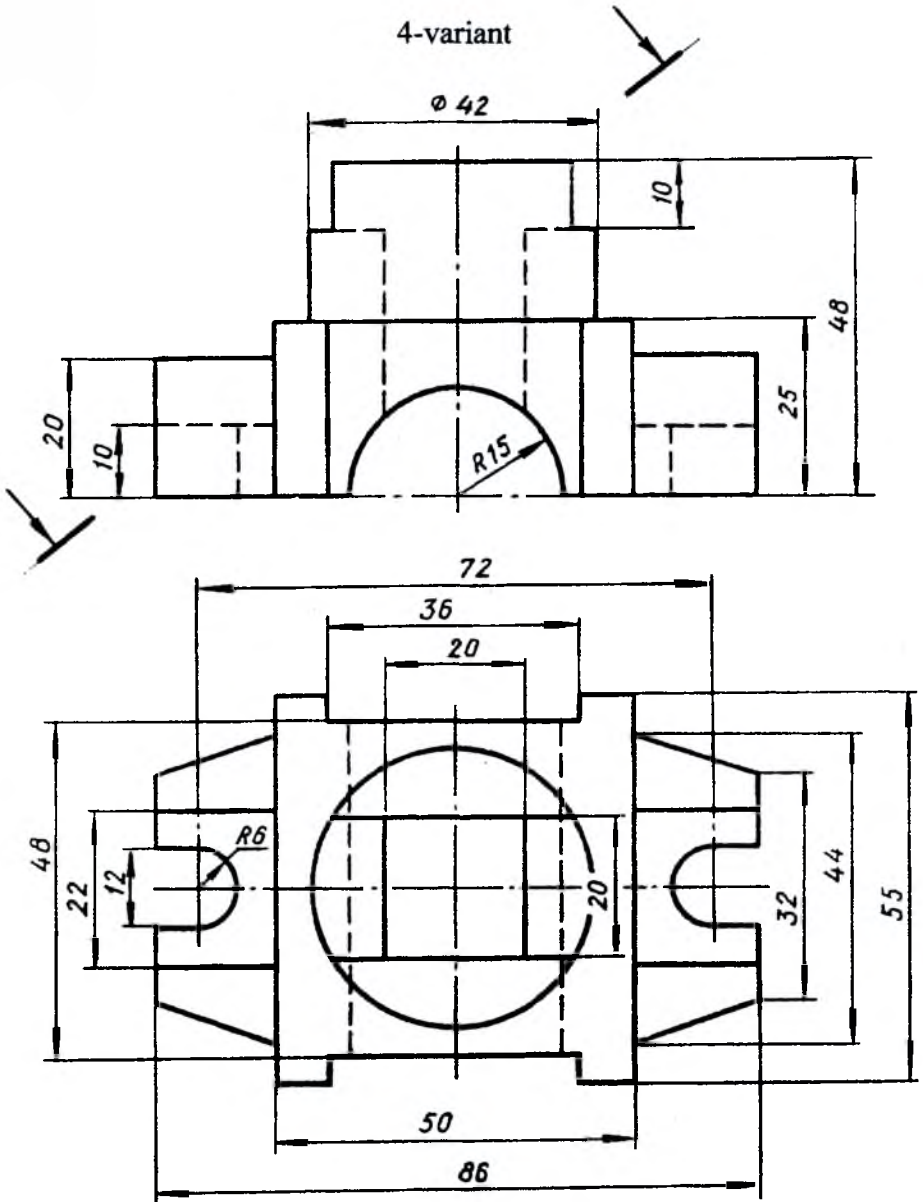


3-variant

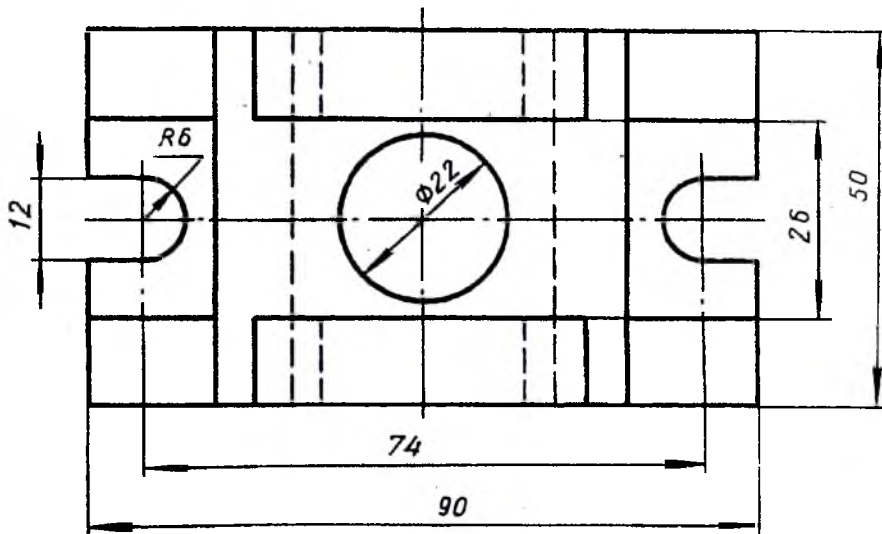
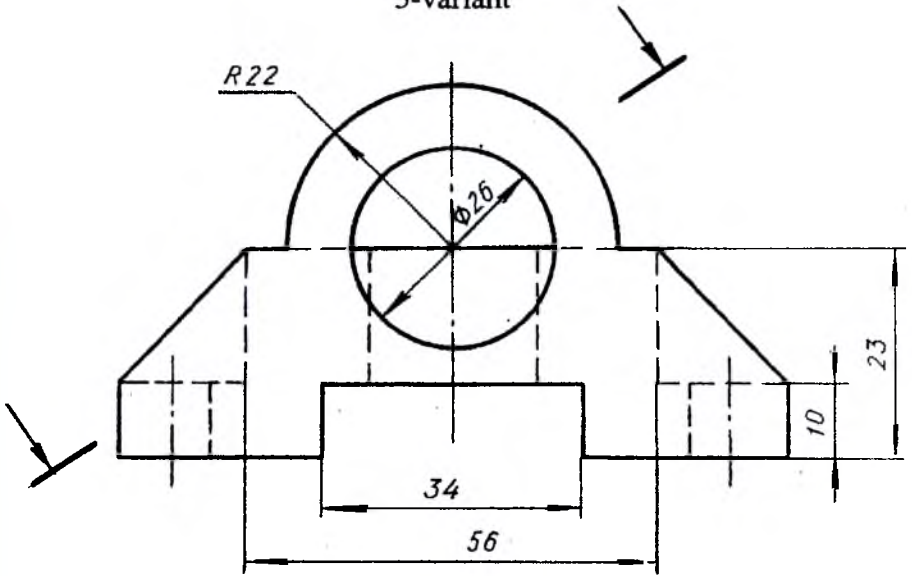


76

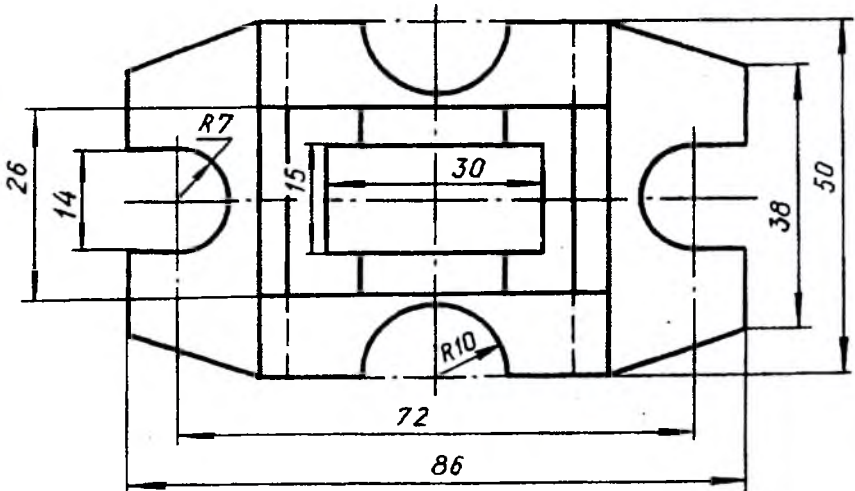
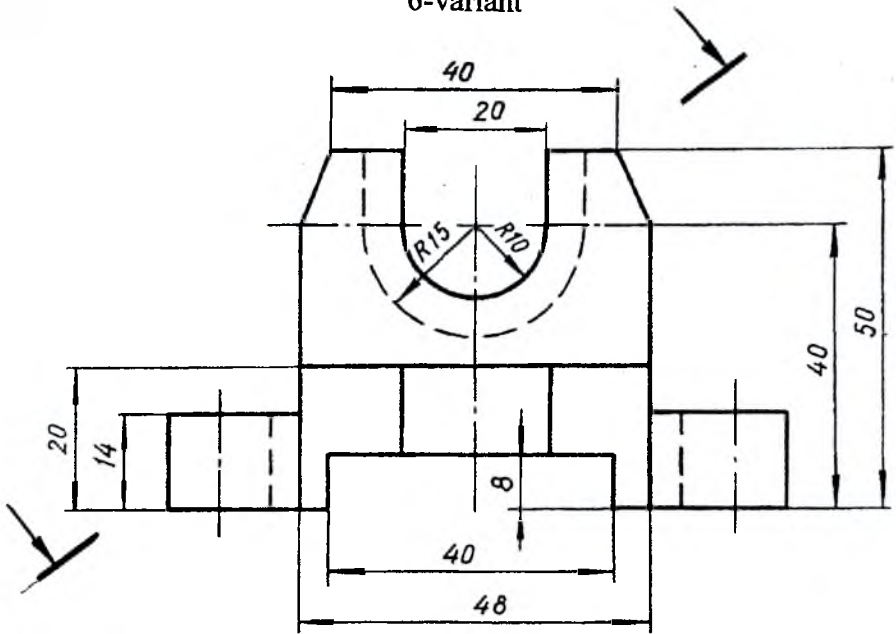
4-variant



## 5-variant

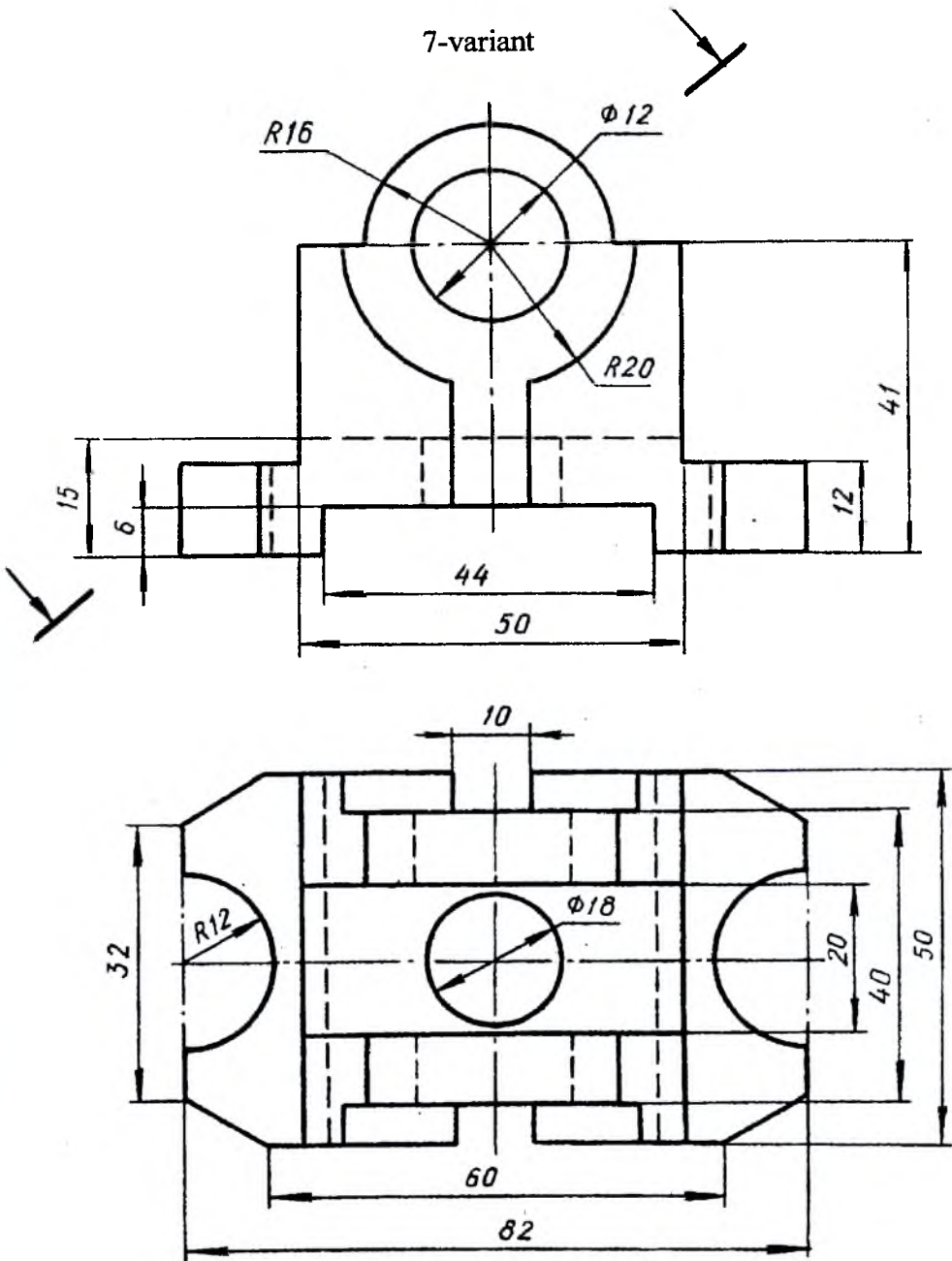


## 6-variant



79

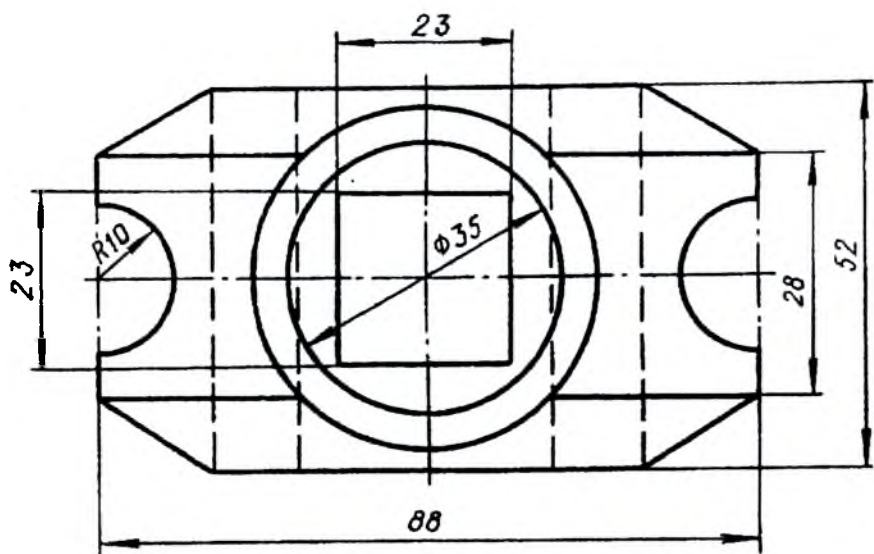
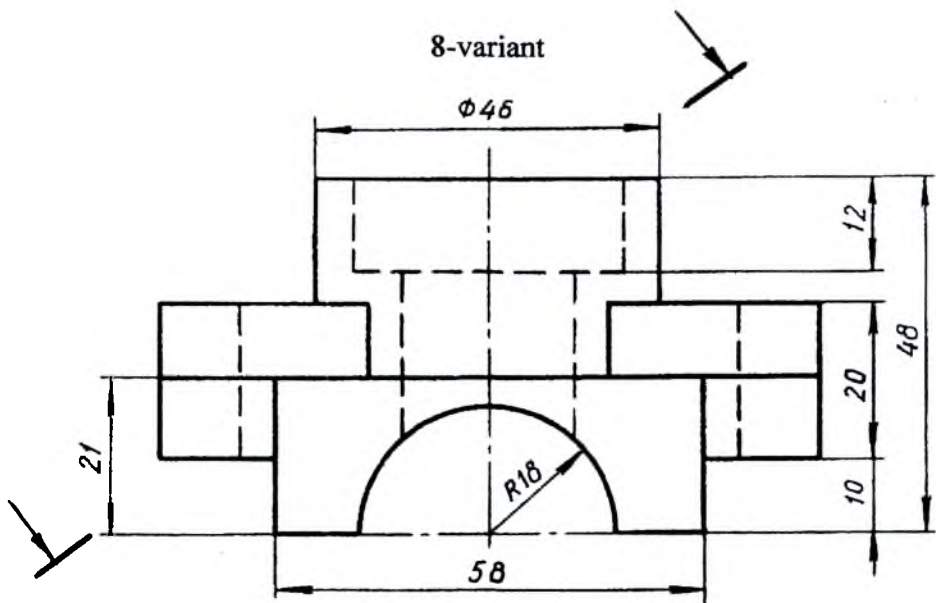
7-variant



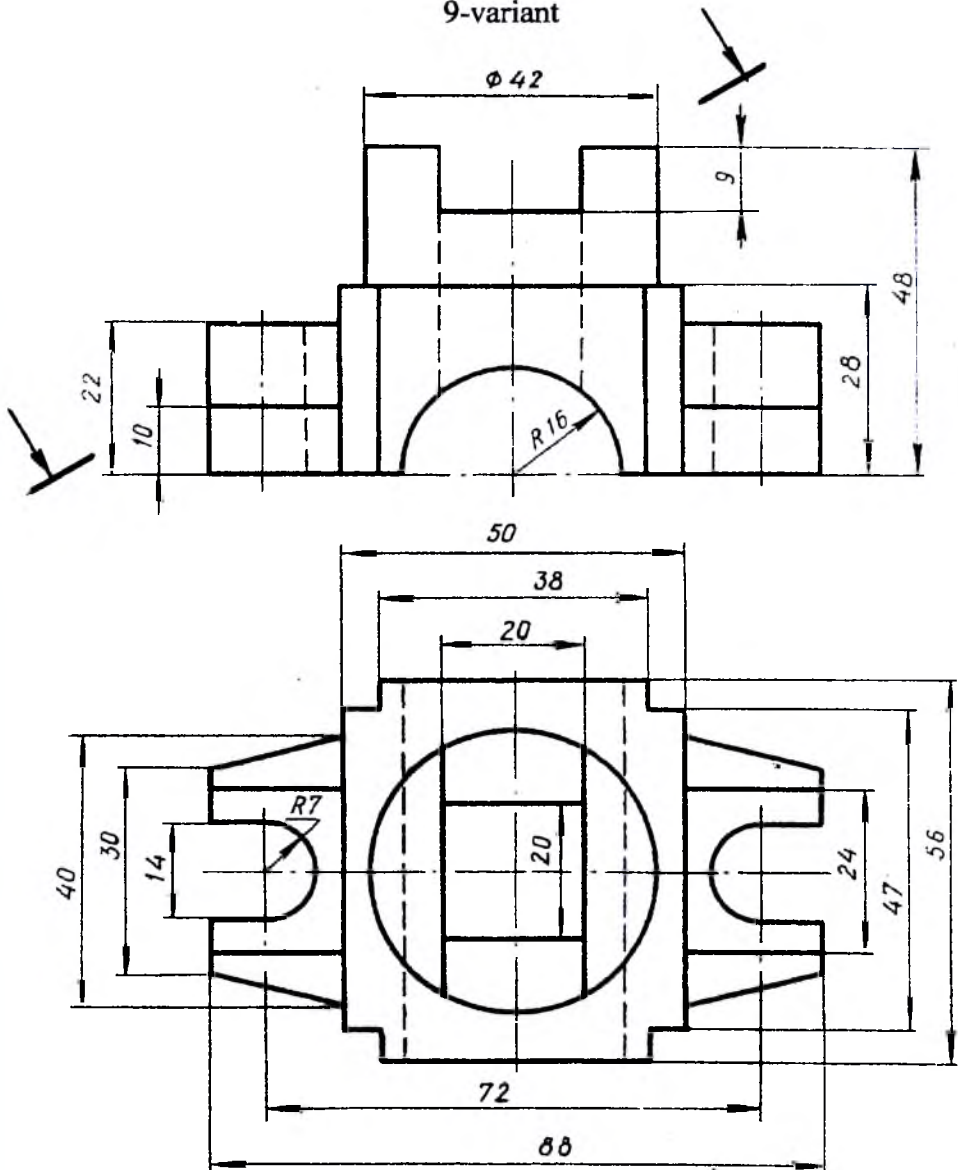


80

8-variant

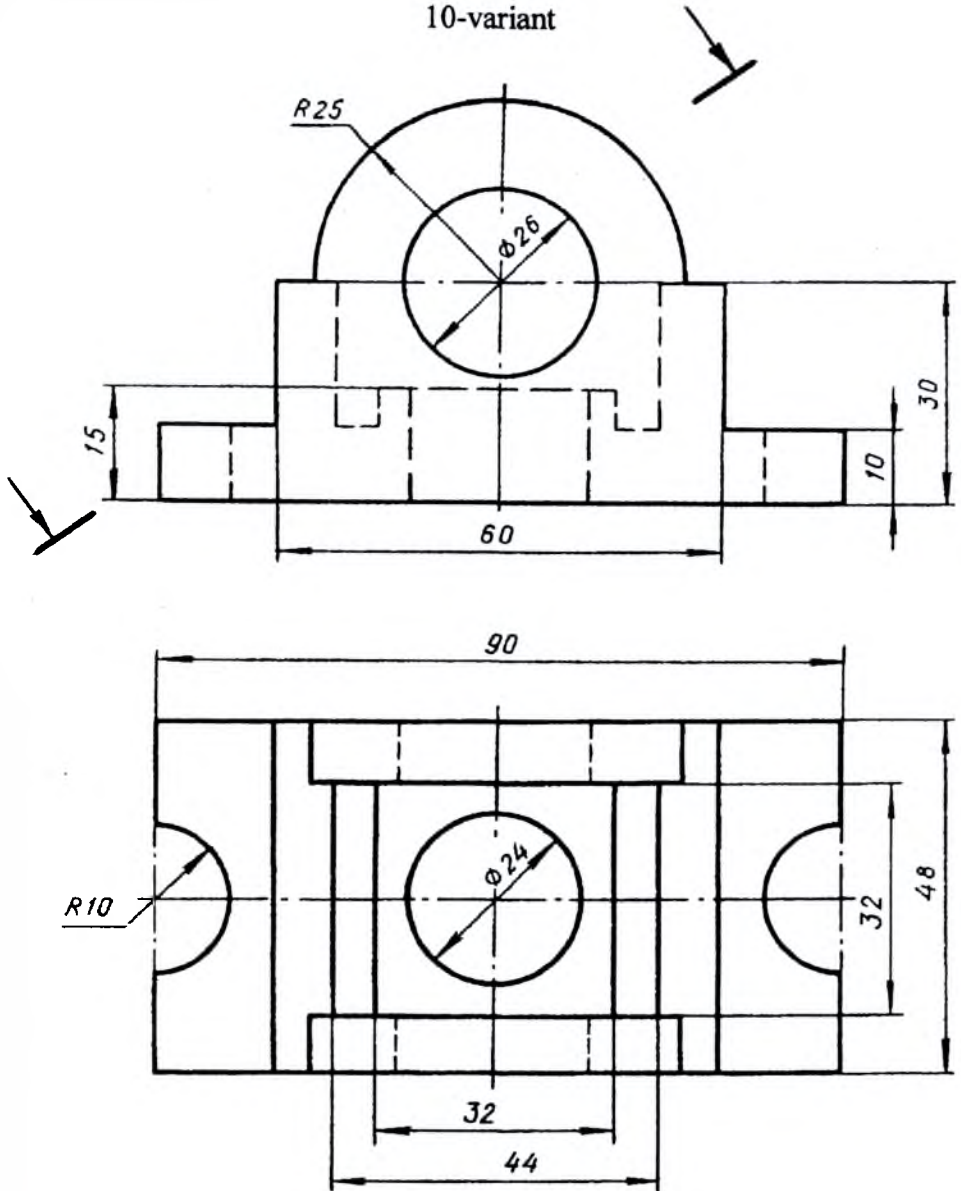


## 9-variant



82

10-variant



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1. A.Abdurahmonov. "Chizmachilikdan grafik ishlar tizimi". Toshkent, "Cho'lpon", 2005
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### Mundarija

1. Og'ma qirqim vakesim. Qirqimlar haqida umumiy tushuncha.....	3
2. Og'ma qirqim.....	3
3. O'ma qirqim va og'ma kesimga misollar (4-shakl).....	5
4. Gorizntal proyeksiyalovchi tekislik orqali hosil qilingan kesim (5shakl).....	7
5. Gorizntal proyeksiyalovchi tekislik orqali hosil qilingan qirqim (6-shakl).....	11
6. Frontal proyeksiyalovchi tekislik orqali hosil qilingan kesim (7-shakl).....	13
7. Frontal proyeksiyalovchi tekislik orqali hosil qilingan qirqim (8-shakl).....	15
8. Profil proyeksiyalovchi tekislik orqali hosil qilingan kesim (9-shakl).....	15
9. Profil proyeksiyalovchi tekislik orqali hosil qilingan qirqim (10-shakl).....	16
10. Ilova.....	18
11. Grafik ishlar bajarish bo'yicha na'muna va variantlar.....	19
12. Foydalanilgan adabiyotlar.....	83

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