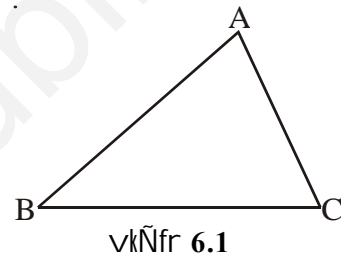


f=kHkqt vksj ml oel xqk

6.1 Hkfiedk

vki ns[k pwpel gsf fd f=kHkqt] rhu js[kk[kk/ka l s cuh , d cm l jy vkÑfr gSA bl oel rhu 'kh"lz' rhu Hkqt;k, j o rhu dksk gkrs gSA ; gk, d $\triangle ABC$ (vkÑfr 6.1) gSA bl ea gSA %

Hkqt;k, j: $\overline{AB}, \overline{BC}, \overline{CA}$
 dksk: $\angle BAC, \angle ABC, \angle BCA$
 'kh"lz: A, B, C

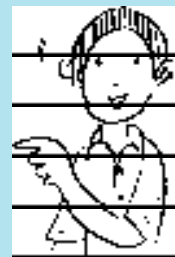


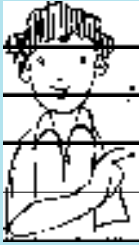
'kh"lz A dh l Eed[k Hkqt;k \overline{BC} gSA D; k vki Hkqt;k \overline{AB} oel l Eed[k dksk dk uke crk l drsg\ vki t kursgsf d f=kHkqt ka d k oxh d j . k (i) Hkqt;k vka (ii) dksk ka oel vk/kj ij fd l idkj fd ; k tkrk gSA

- (i) Hkqt;k vka oel vk/kj ij % fo "keckg] l ef}ckg rFkk l eckg f=kHkqt A
- (ii) dksk ka oel vk/kj ij % U; w dksk] vf/d dksk rFkk l edsk f=kHkqt A mli j crk, x, j l Hk i d kj oel f=kHkqt ka oel vk d kj ka oel uewj d k x vi u s u e w ka dh] l k f F k ; ka oel u e w ka l s r y u k dh ft , v k s j m u o e l d k j s e a p p k z dh ft , A

iz kl dhft,

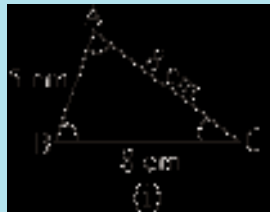
1. $\triangle ABC$ oel N% vo; oka (rhu Hkqt;k vka rFkk rhu dksk ka) oel uke fyf[k, A
2. fyf[k, %
 - (i) $\triangle PQR$ oel 'kh"lz Q dh l Eed[k Hkqt;k
 - (ii) $\triangle LMN$ dh Hkqt;k LM dk l Eed[k dksk
 - (iii) $\triangle RST$ dh Hkqt;k RT dk l Eed[k 'kh"lz





3. vkn̄fr 6.2 nf[k, rFkk f=kHkqt ka ea i R; d dk oxh̄djk dhft, %

- (a) Hkqt kvka ō vk/kj ij
- (b) dks kka ō vk/kj ij



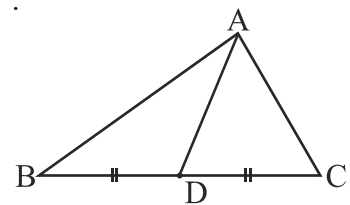
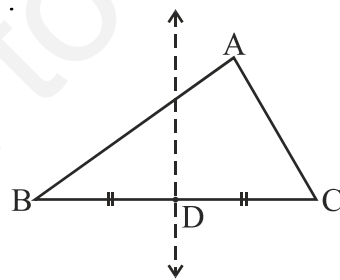
vkn̄fr 6.2

vkb,] f=kHkqt ka ō cjs ea ōN vks vf/d tkuus dk izkl dja

6.2 f=kHkqt dh ekfē; dk, j

vki tkursgā fd , d fn, x, js[kk[kM dk yē Ief}Hkkt d dkx ōI sKkr fd;k tkrk gā

dkx ABC dk fV, (vkn̄fr 6.3) A bl dh dkbZ, d Hkqt k] ekuka \overline{BC} yhft, A dkx \overline{BC} dk yē Ief}Hkkt d Kkr dhft, A dkx dh rg] Hkqt k \overline{BC} dks D ij dkVrh gS tks ml dk eē; 'cnqgSA 'kh"z A dks D I sfeykb, A

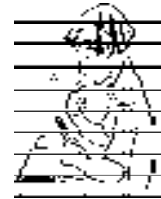


vkn̄fr 6.3

js[kk[kM AD, tks Hkqt k \overline{BC} ō eē; 'cnq D dks I Eedk 'kh"z A I sfeykrk gS f=kHkqt dh , d ekfē; dk gSA

Hkqt k, j \overline{AB} rFkk \overline{CA} yd] bl f=kHkqt dh nks vks ekfē; dk, j [khāp, A ekfē; dk] f=kHkqt ō , d 'kh"z dks I Eedk Hkqt k ō eē; 'cnq I s feykrh gā

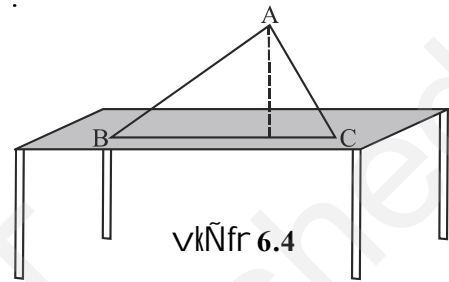
I ksp,] ppkz dhft, vks fyf[k,



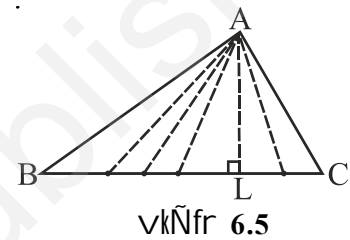
1. ,d f=Hkqt eafdruh ekfè; dk, j gks l drh gð\
2. D;k ,d ekfè; dk i wkz; k f=Hkqt oð vmj eafLFkr gksh gð\ (; fn vki l e>rs gðfd ; g l R; ugha gS rks ml fLFkr oð fy, ,d vkÑfr [kñp, A) .

6.3 f=Hkqt oð 'kh"kye

f=Hkqt oð vkdkj okyk xùks dk ,d VpIMk ABC yhf, A bl s, d est ij l h/k mðokz/j [kMk dhft, A bl dh mppkbzfdruh gð\ ; g mppkbz 'kh"kye A l s Hkqt k \overline{BC} rd dh njih gð (vkÑfr 6-4) A



'kh"kye A l s Hkqt k \overline{BC} rd vuad jsk[kkM [kñps tk l drs gð (vkÑfr 6.5) A bua l sf=Hkqt dh mppkbz dks l h jsk[kkM i n'è'kr djrh gð\



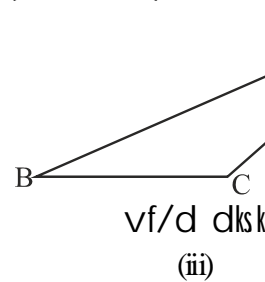
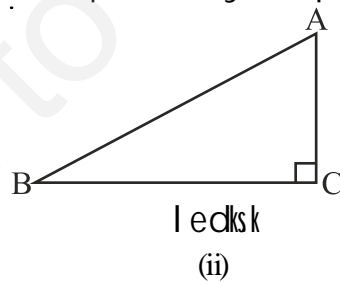
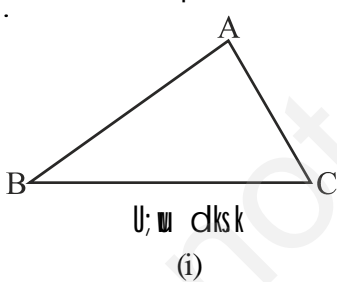
og jsk[kkM tks 'kh"kye A l s l h/k mðokz/j uhps \overline{BC} rd vks ml ij yeor gksh gð bl dh mppkbz gksh gSA jsk[kkM AL f=Hkqt dk ,d 'kh"kye gSA

'kh"kye dk ,d var 'cnj f=Hkqt oð ,d 'kh"kye ij vks n'jk var 'cnj Eedk Hkqt k cukus okyh jsk[kk ij fLFkr gksh gSA i R; sd 'kh"kye l s, d 'kh"kye [kñp tk l drk gSA

I ksp,] ppkz dhft, vks fyf[k,



1. ,d f=Hkqt eafdrus 'kh"kye gks l drs gð\
2. fuEu f=Hkqt ka ea A l s \overline{BC} rd vupeku l s 'kh"kye [kñp, A (vkÑfr 6-6) %



vkÑfr 6.6

3. D;k ,d 'kh"kye i wkz; k f=Hkqt oð vH; rj ea l nð fLFkr gksh \ (; fn vki l e>rs gðfd ; g l R; gksuk vko'; d ugha gS rks ml fLFkr oð fy, ,d vkÑfr [kñp, A
4. D;k vki dksz, d k f=Hkqt l k l drs gð ft l oð nks 'kh"kye ml dh nks Hkqt k, j gh gka\
5. D;k fd l h f=Hkqt dh ekfè; dk o 'kh"kye ,d gh jsk[kkM gks l drk gð\ (l oð % izu 4 o 5 oð fy,) i R; sd izdkj oð f=Hkqt oð 'kh"kye [kñp dj [kkt dfj, A)

blga dhft,



dlx

- (i) l eckgqf=kHkqf
- (ii) l ef}ckgqf=kHkqf rFkk
- (iii) fo"leckgqf=kHkqf

buo@ 'kh"kye rFkk ekfe; dk, j Kkr dhft, A D; k vki buea o@N fo'k'skrk ikrs g@ vius l kFfk; ka o@ l kFk bu ij ppkz dhft, A

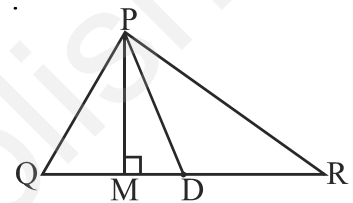
iz ukoyh 6.1

1. ΔPQR ea Hkqf k \overline{QR} dk ee; cnq D gs

\overline{PM} _____ gSA

\overline{PD} _____ gSA

D; k $QM = MR$



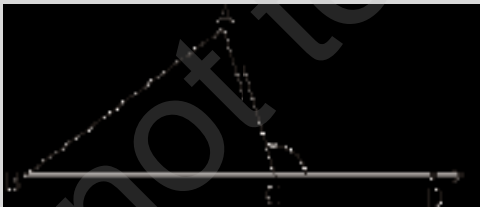
2. fuEu o@ fy, vu@ku l s vkNfr [khp, A

- (a) ΔABC e@ \overline{BE} , d ekfe; dk gSA
- (b) ΔPQR ea PQ rFkk PR f=kHkqf o@ 'kh"kye g@A
- (c) ΔXYZ e@ \overline{YL} , d 'kh"kye ml o@ cfgHkkz ea gSA

3. vkNfr [khp dj i@V dhft, fd, d l ef}ckgqf=kHkqf ea 'kh"kye o ekfe; dk, d gh jf[kk [kM gk l drk gSA

6.4 f=kHkqf dk ckp; dks k, oabl o@ xq k

blga dhft,



vkofr 6.7

1. , d f=kHkqf ΔABC [khp, vkj bl dh, d Hkqf k] \overline{BC} dks , d vkj c<kb, (vkNfr 6.7) A 'kh"kye C ij cus dks k ΔACD ij e; ku nhft, A ; g dks k ΔABC o@ cfgHkkz ea fLFkr gSA ge bl s ΔABC o@ 'kh"kye C ij cuk, d ckp; dks k dgrs g@A

Li"V gsf d $\angle BCA$ rFkk $\angle ACD$ ij Lij l yXu



dks k g@A f=kHkqf o@ 'k'sk nks dks k] $\angle A$ rFkk $\angle B$ ckp; dks k ΔACD o@ nks l Ee[k var@dks k ; k n j LFk var@dks k dgykrsg@A vc dkV dj ; k vDI (Trace copy) y@dj $\angle A$ rFkk $\angle B$, d nu js o@ l yXu feyk dj $\angle ACD$ ij jf[k, t@k fd vkNfr 6-8 ea fn[kk; k x; k gSA

D;k ;s nksika dksk $\angle ACD$ dks iwkr;k vknkfnr djrs gá\

D;k vki dg l drs gá

$$m \angle ACD = m \angle A + m \angle B?$$

2. tš k fd igysfd;k x;k gš ,d f-hkkt ABC ydj ml dk ckþ; dksk ACD cukþ, A dksk eki d dh l gk; rk l s $\angle ACD$, $\angle A$ rFkk $\angle B$ dksefi , A

$\angle A + \angle B$ dk ;sx Kkr dj ml dh ryuk $\angle ACD$ dh eki l s dhft, A dksk eki d dh l gk; rk l s $\angle ACD$ dh eki $\angle A + \angle B$ oð cjkj gksxA ;fn eki ea dksbz =kv gS rks bl dh eki yxHkx cjkj gksxA



vkÑfr 6.8

bu nks fØ;kdyki ka dks dñ vU; f-hkkt ydj vls muoð ckþ; dksk [khp dj] vki nksjk l drs gáA iR; d dj vki ;gh ik, xsfd f-hkkt dk ckþ; dksk ml oð nksika l Eedk var% dks kka oð ;sx oð cjkj gkrk gSA

,d pj.kc¼ o rdñ wkz fof/ l s Hkh bl xqk dh iñV dh tk l drh gSA

fdl h f-hkkt dk ckþ; dksk vi us nksika l Eedk var% dks kka oð ;sx oð cjkj gkrk gSA

fn;k gS $\triangle ABC$ yrs gá $\angle ACD$ bl dk ,d ckþ; dksk gSA

fn[kkuk gS $m \angle ACD = m \angle A + m \angle B$

'kñkz C l s Hkkt k \overline{BA} oð l ekarj CE jšk [kñp, A

vls pr;

pj.k

dkj.k

(a) $\angle 1 = \angle x$

$\overline{BA} \parallel \overline{CE}$ rFkk \overline{AC} , d fr; ð jšk gSA

vr% , dkrj dks l eku gks pfg, A

(b) $\angle 2 = \angle y$

$\overline{BA} \parallel \overline{CE}$ rFkk \overline{BD} , d fr; ð jšk gSA

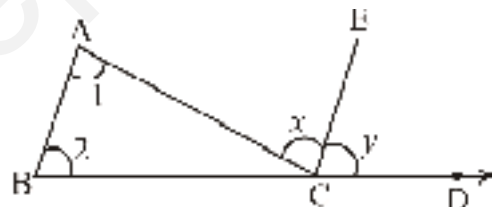
vr% l ær dks l eku gks pfg, A

(c) $\angle 1 + \angle 2 = \angle x + \angle y$

(d) VC, $\angle x + \angle y = m \angle ACD$ (vkÑfr 6.9 l)

vr% $\angle 1 + \angle 2 = \angle ACD$

fdl h f-hkkt ea ckþ; dksk vls ml oð nksika l Eedk var% dks kka oð chp ;g l ca/ f-hkkt oð ckþ; dksk oð xqk oð uke l s tkuk tkrk gSA

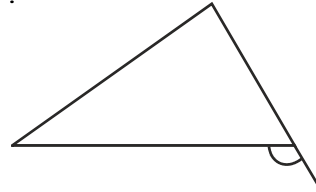


vkÑfr 6.9



I ksp,] ppkZ dhft, vks fyf[k,

1. ,d f-kHkq oq fy, ckp; dksk fHku&fHku idkj Is cuk, tk l drsgA buea Is rhu fuEu idkj Is fn[kk, x, gA (vkNfr 6-10)A



vkNfr 6.10

buoq vrfjDr rhu vks idkj Is Hh ckp; dksk cuk, tk l drs gA mlgA Hh vuqku Is cuk, A

2. fd l h f-kHkq oq ,d 'kh'kZ ij cus nkska ckp; dksk D;k ijLij l eku gks gA
3. fd l h f-kHkq oq ,d ckp; dksk vks ml oq l yXu var% dksk oq ; kx oq ckjsea vki D;k dg l drs gA

mnkj.k 1 vkNfr 6.11 ea x dk eku Kkr dhft, A

gy l Eeqk var% dks kka dk ; kx = ckp; dksk

vFlok $50^\circ + x = 110^\circ$

vFlok $x = 60^\circ$



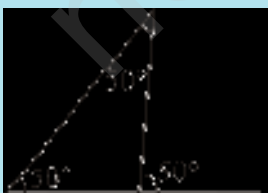
vkNfr 6.11



I ksp,] ppkZ dhft, vks fyf[k,

1. iB; d n'kk ea var% l Eeqk dks kka oq ckjsea vki D;k dg l drs gA tc fd ckp; dksk g% (i) ,d l edsk (ii) ,d vf/d dksk (iii) ,d U;w dksk
2. D;k fd l h f-kHkq dk dkbZ ckp; dksk ,d l jy dksk Hh gks l drk gA

izkl dhft,



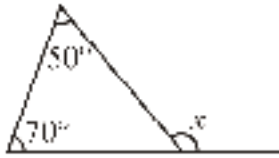
vkNfr 6.12

1. fd l h f-kHkq ea ,d ckp; dksk dh eki 70° g vks ml oq var% l Eeqk dks kka ea l s, d dh eki 25° gSA nu js var% l Eeqk dksk dh eki Kkr dhft, A
2. fd l h f-kHkq oq nls var% l Eeqk dks kka dh eki 60° rFkk 80° gSA ml oq ckp; dksk dh eki Kkr dhft, A
3. D;k bl vkNfr ea dkbZ=kqV gS (vkNfr 6-12)\ fvli .kh dja

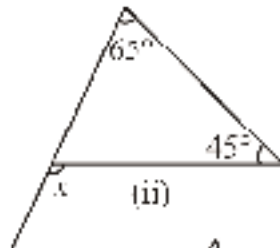
izukoyh 6.2



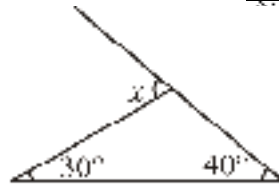
1. fuEu vkNfr; ka ea vKkr ckP; dksk x dk eku Kkr dhft, A



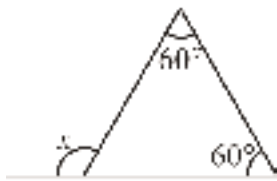
(i)



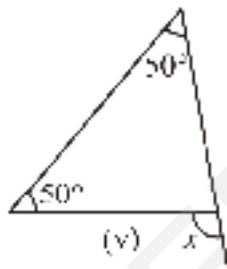
(ii)



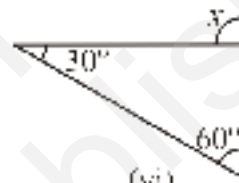
(iii)



(iv)

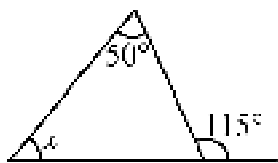


(v)

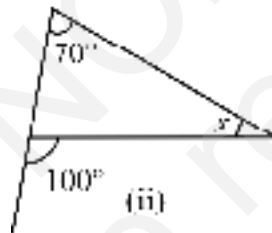


(vi)

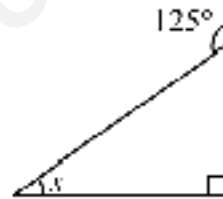
2. fuEu vkNfr; ka ea vKkr var% dksk x dk eku Kkr dhft, A



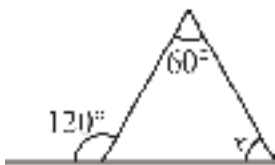
(i)



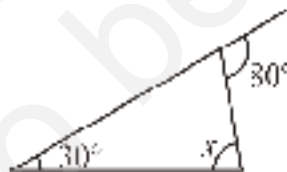
(ii)



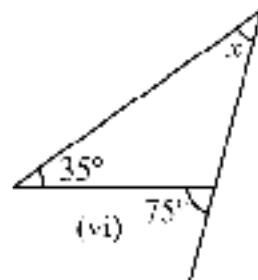
(iii)



(iv)



(v)

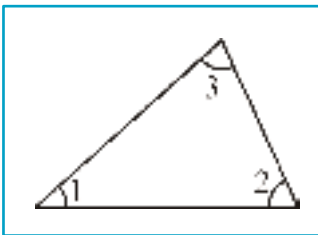


(vi)

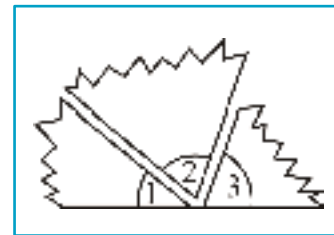
6.5 f-khkt oel var% dks kka dk ; ksx xqk

f-khkt oel rhuka dks kka dk vki l ea l ca/ n'kkZs okyk , d vnHkr xqk gSA bl xqk dks vki fuEufyf[kr pkj fO;kdyki ka }kjk ns[k o l e> i k, xSA

1. , d f-khkt [khrp, A bl oel rhuka dks kka dks dkVdj vyx&vyx dhft, A blga vc bl izkj 0; ofLFkr djoel jf[k, tSk fd vkNfr 6.13(i) o (ii) eafn [kk; k x; k gSA



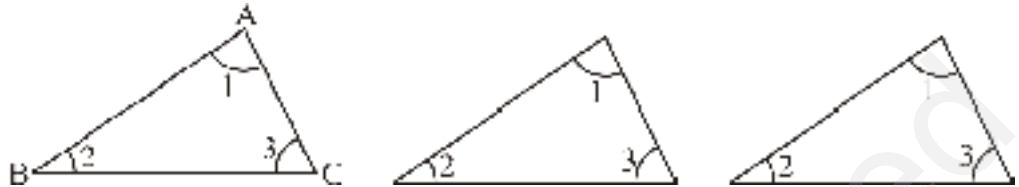
(i)



(ii)

vkNfr 6.13

- ; s rhuka dksk feydj , d dksk cukrs gSA ft l dh eki 180° gA
 bl i d[kj] f=kHkqt o@ rhuka dkskka dh eki ka dk ; ksx 180° gkrk gSA
2. bl rF; dksvki , d vU; fof/ }kjk Hkh nq[k l drsgSA fd l h $\triangle ABC$ o@ rhu i fr: i cukb,] (vkÑfr 6.14) A



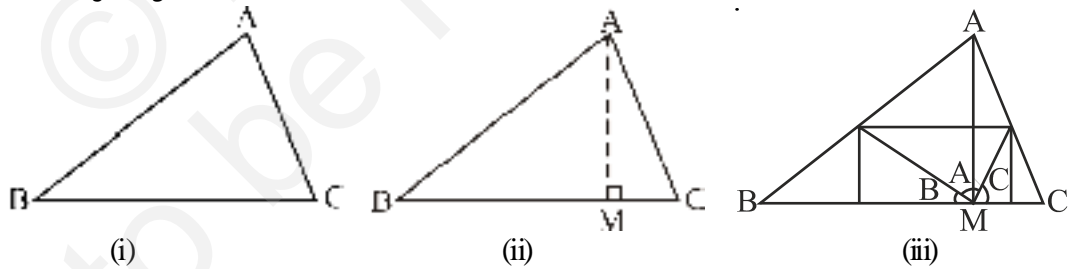
vkÑfr 6.14

bu rhuka dks vkÑfr 6.15 dh Hkkfr feykdj Bhd l s jf[k, A $\angle 1 + \angle 2 + \angle 3$ o@ ckjsea vki D; k voyksdu djrs gA\ (D; k vki ; gk d@; dksk l s l a@/r xqk Hkh nq[k i krs gA\)



vkÑfr 6.15

3. dkx f=kHkqt] tS s $\triangle ABC$ (vkÑfr 6.16) dkfV, A bl f=kHkqt dks ekM/dj 'kh"lz A l s xq AM fu/kZjr dhft, A vc bl f=kHkqt o@ rhuka dkska dks bl i d[kj ekSM+ ft l l s rhuka 'kh"lz A, B rFkk C `cnqm ij feyaA



vkÑfr 6.16

- vki nq[krsgafd f=kHkqt o@ rhuka dksk feydj , d l jy dksk cukrs gA ; g f@; kdyki i q% n'kkZ-k gSfd f=kHkqt o@ rhuka dkskka dh eki ka dk ; ksx 180° gkrk gSA
4. viuh vH; kl i qLrdk ea dksZ rhu f=kHkqt] ekula $\triangle ABC$, $\triangle PQR$ rFkk $\triangle XYZ$ [khfip, A bu l Hkh f=kHkqt ka o@ i R; d dksk dh eki , d dksk ekid }kjk eki dj Kkr dhft, A bu eki ka dks rkfydk : i ea bl i d[kj fyf[k,]

Δ dk uke	dks kka dh eki	rhuka dks kka dh eki ka dk ; ksx
$\triangle ABC$	$m\angle A =$ $m\angle B =$ $m\angle C =$	$m\angle A + m\angle B + m\angle C =$
$\triangle PQR$	$m\angle P =$ $m\angle Q =$ $m\angle R =$	$m\angle P + m\angle Q + m\angle R =$
$\triangle XYZ$	$m\angle X =$ $m\angle Y =$ $m\angle Z =$	$m\angle X + m\angle Y + m\angle Z =$

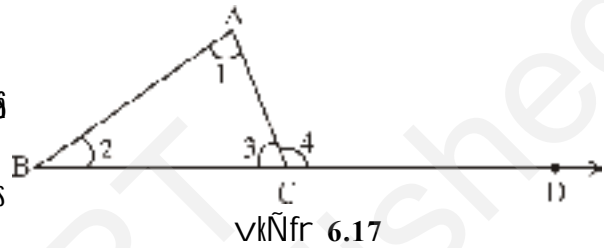
eki use ea gblz l hkkfor =hv; kadls è; ku eaj [krsgq vki ik, psfd väre Lrbk earhuka dks kka dk ; lsk 180° (; k yxHkx 180°) gh gSA

i wkz rk 'kq' eki l hko gks is ij ge ; gh ik, psfd f-hkqt oel rhuka dks kka dh eki ka dk ; lsk 180° gkrk gSA

vc vki vius bl fu.kz, dks rdz wkz dFluka }kjk pj.kc¼ : i ea i Lrq dj l drs gSA

dFku f-hkqt oel rhuka dks kka dh eki ka dk ; lsk 180° gkrk gSA bl rF; dks LFkfi r djus oel fy, ge f-hkqt oel ckp; dks k oel xqk dk mi ; lsk djrs gSA

fn; k gS % $\triangle ABC$ oel rhu dks k $\angle 1, \angle 2$ rFkk $\angle 3$ gS (vkNfr 6-17) A



$\angle 4$, d ckp; dks k gS tks Hkqt k \overline{BC} dks D rd c<kus ij curk gSA

mi i fÜk $\angle 1 + \angle 2 = \angle 4$ (ckp; dks k dk xqk)

$\angle 1 + \angle 2 + \angle 3 = \angle 4 + \angle 3$ (nksuka i {kka ea $\angle 3$; lsk djus ij)

i jarq $\angle 4$ rFkk $\angle 3$, d jf[kd ; ke cukrs gSA vr% budk ; lsk 180° gSA vFkkz- $\angle 1 + \angle 2 + \angle 3 = 180^\circ$

vkb,] vc nq[ka fd f-hkqt oel dks kka oel bl xqk dkj fofHku l eL; k, j gy djus ea ge oel s mi ; lsk dj l drs gSA

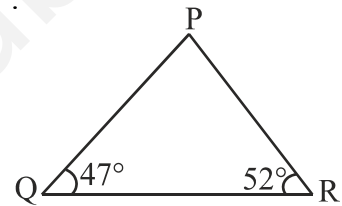


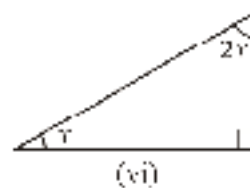
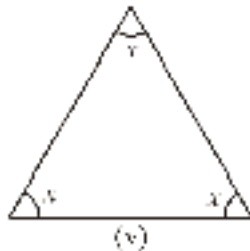
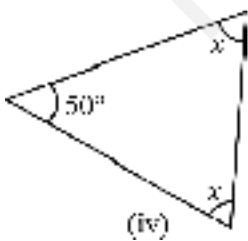
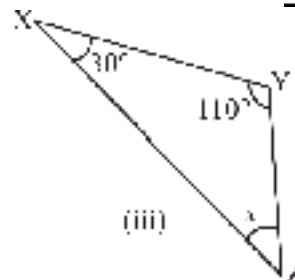
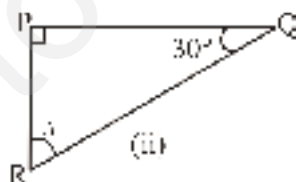
Fig 6.18

mngj.k 2 nh xbz vkNfr 6-18 ea $\angle P$ dh eki Kkr dhft, A f-hkqt oel dks kka dk ; lsk xqk l sm $\angle P + 47^\circ + 52^\circ = 180^\circ$ vr% $m\angle P = 180^\circ \text{ } \hat{ } 47^\circ \text{ } \hat{ } 52^\circ = 180^\circ \text{ } \hat{ } 99^\circ = 81^\circ$

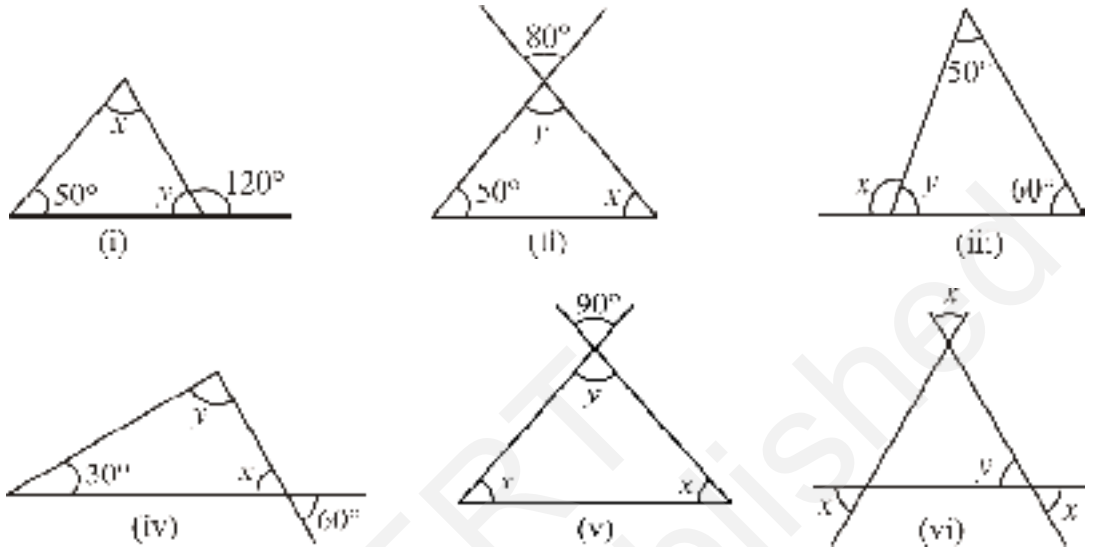
izukoyh 6.3



1. fuEukfidr vkNfr; ka ea vKkr x dk eku Kkr dhft, A



2. fuEukādr vkŅīfr; ka ea vKkr x vKš y dk eku Kkr dhft, A



iz kl dhft,



1. , d f=kHkqt oŃ nks dks k 30° rFkk 80° gŃA bl f=kHkqt dk rhl jk dks k Kkr dhft, A
2. fdl h f=kHkqt dk , d dks k 80° gŃrFkk 'kšk nksuka dks k cjkcy gŃA cjkcy dks kka ea i R; Ń dh eki Kkr dhft, A
3. fdl h f=kHkqt oŃ rhuka dks kka ea $1\%2\%1$ dk vuq kr gŃA f=kHkqt oŃ rhuka dks k Kkr dhft, A f=kHkqt dk nksuka izdkj lsoxhŃdj.k Hkh dhft, A



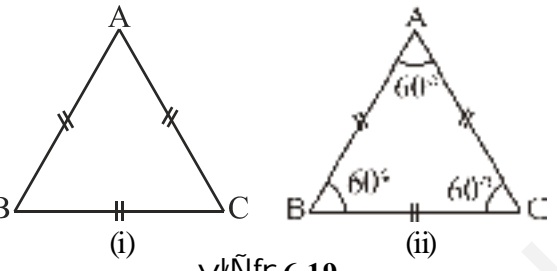
I kŃp,] ppkZ dhft, vKš fyf[k,

1. D;k dksZ, Ń k f=kHkqt I blko gŃft l oŃ nks dks k l edsk k gka\
2. D;k dksZ, Ń k f=kHkqt I blko gŃft l ea nks dks k vf/d dks k gka\
3. D;k dksZ, Ń k f=kHkqt I blko gŃft l ea nks dks k U; w dks k gka\
4. D;k dksZ, Ń k f=kHkqt I blko gŃft l ea rhuka dks k 60° l s vf/d gka\
5. D;k dksZ, Ń k f=kHkqt I blko gŃft l ea rhuka dks k 60° oŃ gka\
6. D;k dksZ, Ń k f=kHkqt I blko gŃft l ea rhuka dks k 60° l s de oŃ gka\

6.6 nks fo' kšk f=kHkqt % l eckgq rFkk l ef}ckgq

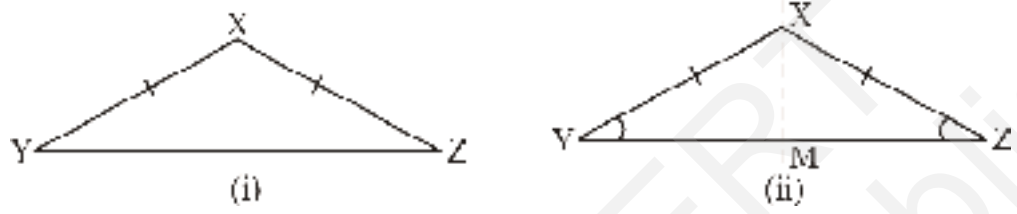
, d f=kHkqt] ftl dh rhuka Hkqt kvla dh eki l eku gkš l eckgq f=kHkqt dgykrk gŃA , d l eckgq f=kHkqt ABC (vkoŃfr 6.19) cukb, A bl dk ifr: i ; kuh bl h eki dk , d vKš l eckgq f=kHkqt dkx kVaA igys f=kHkqt dks fLFkj j[krs gq bl ij nŃ jk f=kHkqt bl s <drs

gq j[kA nB jk f-kHkqf igys dks ijh rjg <d yrk gSA nB js' f-kHkqf dks igys f-kHkqf ij fd l h Hkh rjg ? kqkdj j [kq osnksuka f-kHkqf fi Qj Hkh , d nB js dks <d yrs gB D;k vki nq[k ikrsgB fd ; fn f-kHkqf dh rhuka Hkqf k, j l eku eki dh gB rc rhuka dksk Hkh l eku eki oB gh gkrs gB ge fu" d" kZ fudkyrs gB B



vkNfr 6.19

(i) iR; d dksk dh eki 60° gksh gSA , d f-kHkqf ftl dh nks Hkqf kvka dh eki l eku gB , d l ef}ckgq f-kHkqf dgykrk gSA



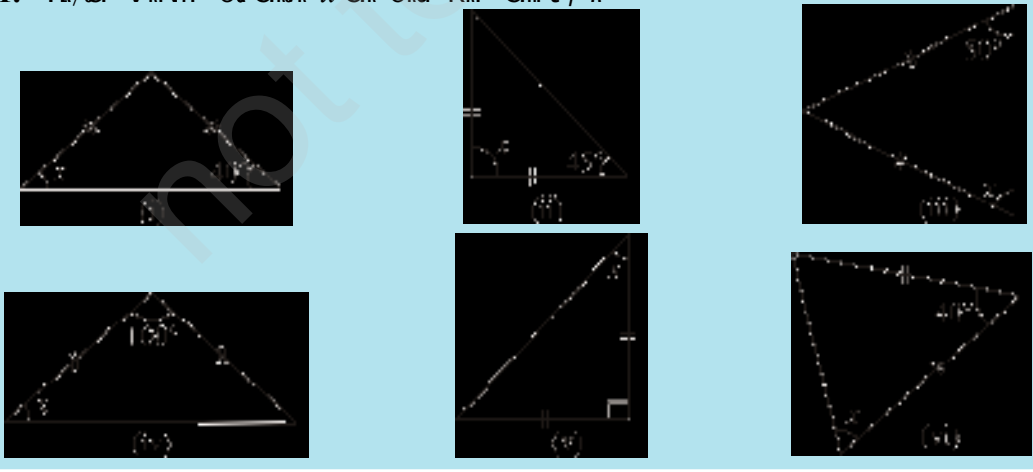
vkNfr 6.20

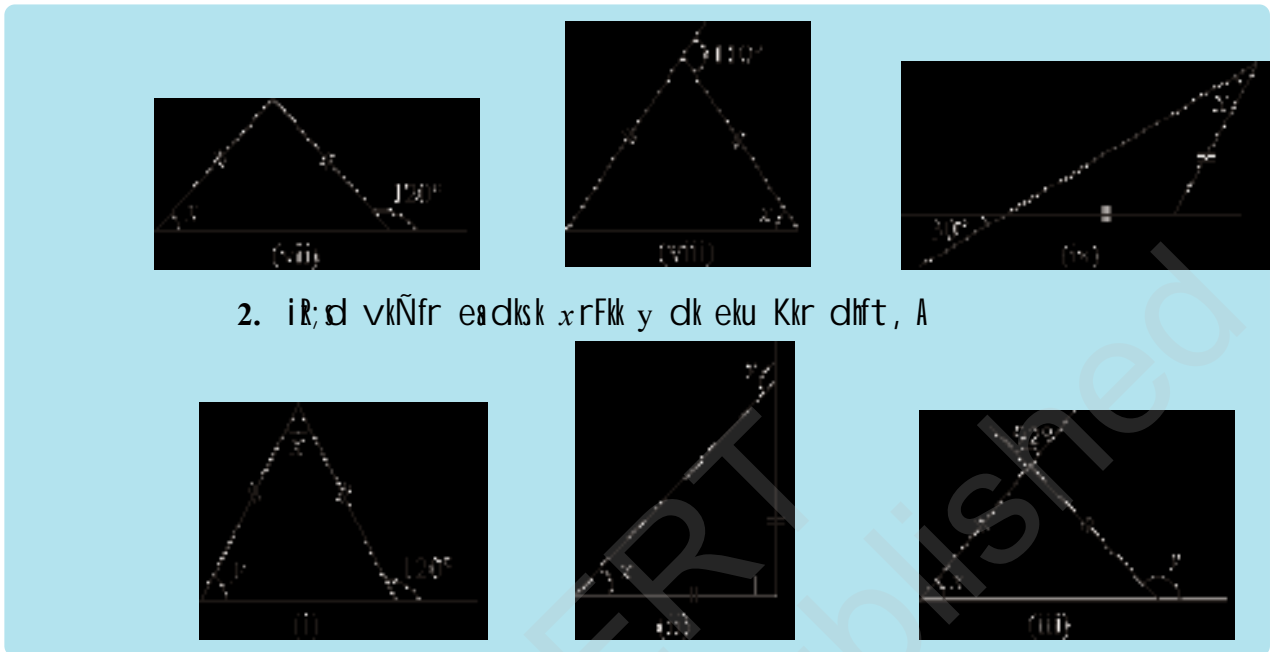
dlx XYZ, dkfV, j ftl ea Hkqf k XY = Hkqf k XZ gks (vkoUfr 6.20) A bl sbl izdkj eksM, ftl l s' kh" kZ Z ' kh" kZ Y ij vkPNkfnr gkA vc ' kh" kZ X l sxq XM bl f-kHkqf dk l efer v{k gS (ftl oB ckjs ea vki vè;k; 14 ea i < >) A vki nq[krs gB fd ∠Y vks ∠Z , d nB js dks i w k ; k < d yrs gB XY vks XZ f-kHkqf dh l e Hkqf k, j dgykrh gB YZ vk/kj dgykrk gS ∠Y rFkk ∠Z vkèkkj dksk dgykrsgB tks ijLij l eku gkrs gB

bl izdkj ge fu" d" kZ fudkyrs gB fd l ef}ckgq f-kHkqf ea (i) nks Hkqf k, j cjkj yækbz dh gksh gB (ii) l eku Hkqf kvka oB l keus dk dksk l eku gksh gB

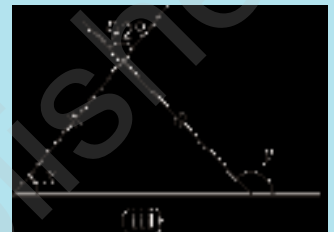
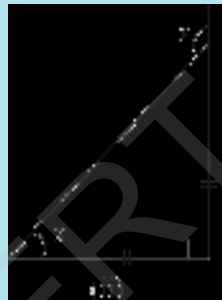
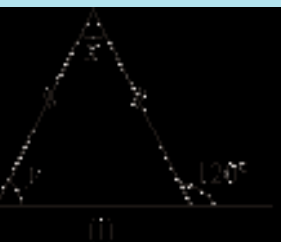
izkl dhft,

1. iR; d vkNfr ea dksk x dk eku Kkr dhft, A



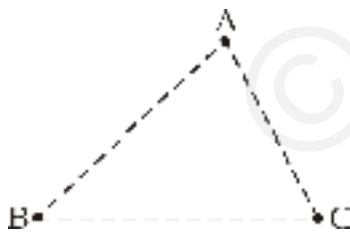


2. iR; d vkÑfr eadsk xrFkk y dk eku Kkr dhft, A



6.7 , d f-kHkqt dh nksHkqt kvka dh eki ka dk ; ksx

1. vius [ky oð eñku earhu ñcnq A, B rFkk C vñdr dhft, tks, d gh j[kk eau gkaA pñk i kmMj ydj AB, BC rFkk AC i Fk fu/kZjr dhft, A



vkÑfr 6.21

viusfdlh fe-k lsdgf, fd og fu/kZjr i Fkka dk mi ; ksx dj fd lh idkj A l s i kj ðk dj Crd igpsA mnkgj.k oð fy,) og igysi Fk \overline{AB} ij vkj fi Oj i Fk \overline{BC} ij pydj C ij igpsA vFkok i Fk \overline{AC} ij pydj lh/s C ij igp tk, A LokHkkfod gSfd og lh/k i Fk AC i l m djxh A vxj og dkbZvU; i Fk (tS s \overline{AB} fi Oj \overline{BC}) yxh] rc ml s vfekd njih pyuh i Mxh A nñ js 'kCnka ea

$$AB + BC > AC \tag{i}$$

bl h idkj ; fn og B l s i kj ðk dj A ij igppuk pkgrh gSrc og igysi i Fk \overline{BC} vkj fi Oj i Fk \overline{CA} ughayxh cfYd og i Fk \overline{BA} ydj lh/k B l s A ij igpsxh A ; g bl fy, fd

$$BC + CA > AB \tag{ii}$$

bl h idkj rdZ djus ij ge n[krs gð fd

$$CA + AB > BC \tag{iii}$$

bl l s irk pyr k gSfd fd lh f-kHkqt dh nksHkqt kvka dh eki ka dk ; ksx rhl jh Hkqt k dh eki l s cMk gsrk gSA

2. vyx&vyx eki kaokyh 15 NkVh rhy; k; (; k i fèðk) yhft, A mudh eki ð eku yhft, 6 cm] 7 cm] 8 cm 9 cm] -----20 cm gðA

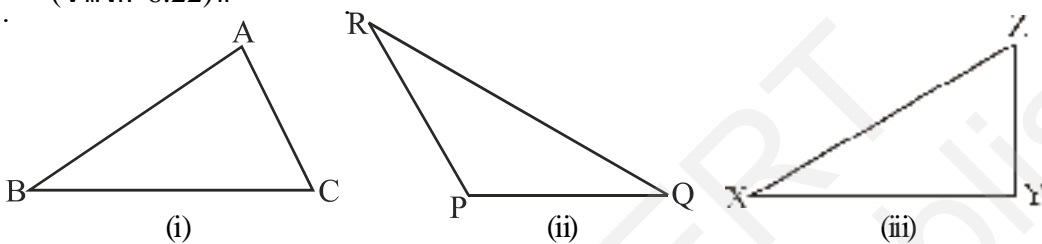
buea l s dkbZ rhu rhy; k; ydj f-kHkqt cukus dk iz Ru dhft, A rhu&rhu rhy; ka oð fofHkku l eg ydj bl i fèð; k dks nksjkb, A

eku yift, igys vki nks rhfy;ki 6 cm o 12 cm yach yrs gSA rhl jh rhyh 12 o 6 = 6 cm lsvf/d yach yfdu 12 + 6 = 18 cm l sde yach ysuh gkskh A ; g l c djoel nsk, vls irk yxkb, fd , d k D; ka vko'; d gSA

, d f=Hkqt cukusoel fy, vki dks rhu rhfy;ki bl izkj pquh gkakh ft l l sfd muej dkbz nks rhfy;ka dh yackb; ka dk ; kse rhl jh rhyh dh yackbz lsvf/d gksA

bl ifo; k l s; g Hkh irk pyr k gsf d , d f=Hkqt dh nks Hkqt kvka dh eki ka dk ; kse rhl jh Hkqt k dh eki lsvf/d gksk gSA

3. viuh vH;kl & iqlrdk ea dkbz rhu f=Hkqt] tS s ΔABC , ΔPQR rFkk ΔXYZ cukb, (vkNfr 6.22)A



vkNfr 6.22

viusiokus (: yj) dh l gk; rk l s bu f=Hkqt ka dh Hkqt kvka dks eki dj] , d rkfydk oel : i eafueu izkj lsfyf[k, %

Δ dk uke	Hkqt kvka dh eki	D; k ; g l gh gS	
ΔABC	AB ___	$AB \text{ o } BC < CA$	(gkægh)
	BC ___	$BC \text{ o } CA < AB$	(gkægh)
	CA ___	$CA \text{ o } AB < BC$	(gkægh)
ΔPQR	PQ ___	$PQ \text{ o } QR < RP$	(gkægh)
	QR ___	$QR \text{ o } RP < PQ$	(gkægh)
	RP ___	$RP \text{ o } PQ < QR$	(gkægh)
ΔXYZ	XY ___	$XY \text{ o } YZ < ZX$	(gkægh)
	YZ ___	$YZ \text{ o } ZX < XY$	(gkægh)
	ZX ___	$ZX \text{ o } XY < YZ$	(gkægh)

bl ifØ; k l sgekjs fi Nys vuøku dh Hkh i f"V gkrh gSA vr% ge fu"d"lz fudkyrs gð fd , d f=kHkqt dh dkbz nks Hkqt kvka dh eki ka dk ; ksx] rhl jh Hkqt k dh eki l s vf/d gkrh gSA

l kfk gh gea ; g Hkh irk pyr k gSfd , d f=kHkqt dh fd l h nks Hkqt kvka dk varj] rhl jh Hkqt k dh eki l s de gksrk gSA

mknkj . k 3 D; k dkbz , d k f=kHkqt l bllko gS ft l dh Hkqt kvka dh eki a 10-2 cm] 5-8 cm rFkk 4.5 cm gla \

gy eku yhft , , d k f=kHkqt l bllko gSA rc bl f=kHkqt dh dkbz Hkh nks Hkqt kvka dh yackb; ka dk ; ksx rhl jh Hkqt k dh yackbz l s vf/d gksrk A v kb,] tkp djoð nq ka%

- D; k $4.5 + 5.8 > 10.2?$ l gh gS
- D; k $5.8 + 10.2 > 4.5?$ l gh gS
- D; k $10.2 + 4.5 > 5.8?$ l gh gS

vr% bu Hkqt kvka okyk f=kHkqt l bllko gSA

mknkj . k 4 , d f=kHkqt dh nks Hkqt kvka dh eki 6 cm rFkk 8 cm gSA bl dh rhl jh Hkqt k dh eki fdu nks l q; kvka oð chp gksch \

gy ge tkurs gð fd f=kHkqt dh dkbz nks Hkqt kvka dk ; ksx rhl jh l s vf/d gksrk gSA

vr% rhl jh Hkqt k] nh gpbz nks Hkqt kvka oð ; ksx l s de gksch pkfg, A v Fkkz~ rhl jh Hkqt k $8 + 6 = 14$ cm l s de gksch A

; g rhl jh Hkqt k nh gpbz nks ka Hkqt kvka oð varj l s vf/d gksch pkfg, A v Fkkz~ rhl jh Hkqt k $8 + 6 = 2$ cm l s vf/d gksch A

rhl jh Hkqt k dh eki 2 cm l s vf/d rFkk 14 cm l s de gksch pkfg, A

iz ukoyh 6.4

1. fuEu nh xbz Hkqt kvka dh eki ka l s D; k dkbz f=kHkqt l bllko gS \

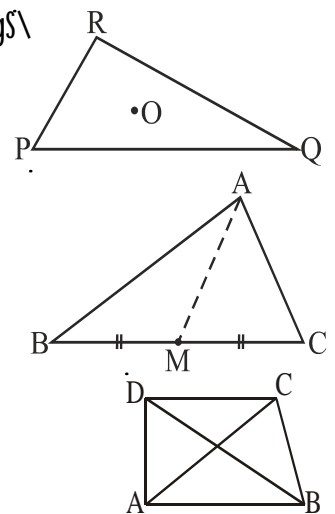
- (i) 2 cm, 3 cm, 5 cm
- (ii) 3 cm, 6 cm, 7 cm
- (iii) 6 cm, 3 cm, 2 cm

2. f=kHkqt PQR oð vH; rj ea dkbz cnq O yhft , A

- D; k ; g l gh gSfd
- (i) $OP + OQ > PQ?$
- (ii) $OQ + OR > QR?$
- (iii) $OR + OP > RP?$

3. f=kHkqt ABC dh , d ekfe; dk AM gSA crkb, fd D; k

- $AB + BC + CA > 2AM?$
- (l d r % ΔABM rFkk ΔAMC dh Hkqt kvka i j fopkj dhft , A)



4. ABCD , d prhlkt gSA D; k $AB + BC + CD + DA > AC + BD$?
5. ABCD , d prhlkt gSA D; k $AB + BC + CD + DA < 2(AC + BD)$?
6. , d f-hkqt dh nksHkqt kvka dh eki 12 cm rFkk 15 cm gSA bl dh rhl jh Hkqt k dh eki fdu nseki ka oð chp gksjh pkfg, \

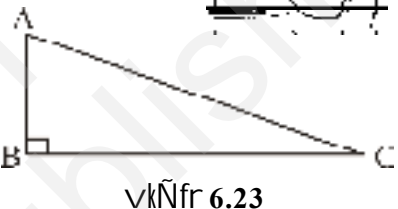
I ksp,] ppkZ dhft, vks fyf[k,



1. fd l h f-hkqt ea D; k ml oð dkbZ nks dks kka d k ; kx rhl js dks k l s l nð vf/d gkrk gS\

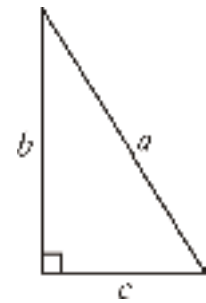
6.8 I edks k f-hkqt rFkk i kbFkxkj l xqk

bZ k l s NBh 'krkCnh i nð] , d ; wkuh nk'kZud i kbFkxkj l uš I edks k f-hkqt l s l nð/r , d cgr mi ; kxh o egroi wZ xqk oð ckjs ea irk yxk; k] ft l s ge bl vuHkx ea crk jgs gSA vr% bl xqk dks muoð uke l s gh tkuk tkrk gSA okLro eabl xqk dk Kku d n vU; nš kka oð ykxka dks Hkh Fkk A Hkkjrh; xf.krk cS'k; u usHkh bl xqk oð I ed{k , d xqk dh tkudkj nh Fkh A



vkÑfr 6.23

vc ge i kbFkxkj l xqk dk foLrkj l svè; ; u djrs gSA I edks k f-hkqt ea ml dh Hkqt kvka dks fo'kšk uke fn, tkrsgSA I edks k oð I keus okyh Hkqt k dks d. kZ dgrs gSA vU; nks Hkqt kvka dks I edks k f-hkqt oð i kn (legs) dgrs gSA

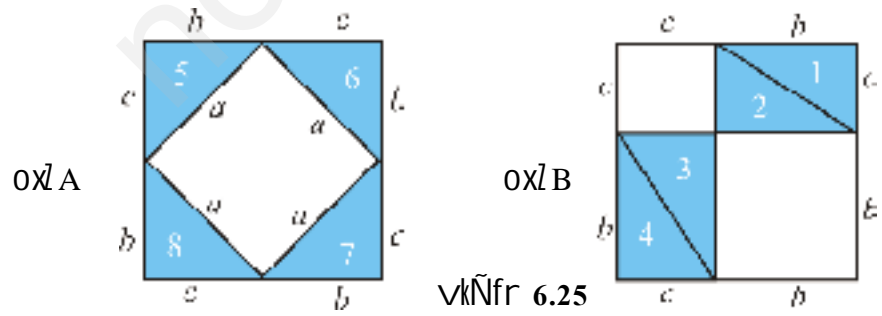


vkÑfr 6.24

$\triangle ABC$ ea (vkoFr 6.23), 'kñkZ B ij I edks k cuk gSA vr% AC bl dk d.kZ gSA \overline{AB} rFkk \overline{BC} I edks k f-hkqt ABC oð nks i kn gSA fd l h Hkh eki dk , d I edks k f-hkqt yd j ml oð vkb ifr: i cukb, A mnkgj.k oð fy, , d I edks k f-hkqt yrs gSA ft l oð d.kZ dh eki a b dkbZ rFkk ml oð nks i knka dh eki b b dkbZ rFkk c b dkbZ gS (vkÑfr 6-24)A

, d dkx eki $b + c$ oð cjkj gksA

vc vi us vkb f-hkqt ka ea l spkj f-hkqt ka dks oxZ A ear Fkk pkj f-hkqt ka dks oxZ B ea LFkfi r dhft, tš k fd fuEu vkÑfr ea fn[kk; k x; k gS (vkÑfr 6-25)A



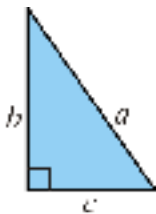
vkÑfr 6.25

vki tkurs gáfd nkska oxl , d: i gá ; kuh , d leku gá rFkk j [ks x, vkBka f=kHkqt Hkh , d leku gáA
 vr% oxl A dk vukPNfnr {kski Oy = oxl B dk vukPNfnr {kski Oy
 vFkok oxl A o@ Hkhrj okys oxl dk {kski Oy = oxl B o@ Hkhrj nkska vukPNfnr oxks o@
 {kski Oy dk ; ks vFkkZ-

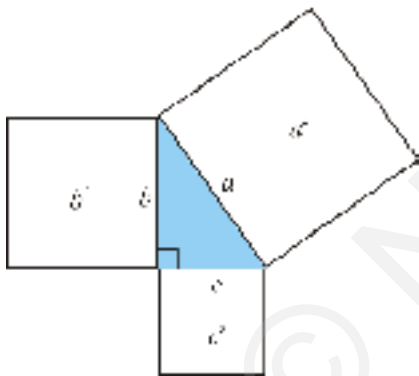
$$a^2 = b^2 + c^2$$

;g ikbFkkxkjl xqk gSA bls bl izdkj dgk tk l drk gS%

, d ledsk f=kHkqt ea
 d.kZ ij cuk oxl = i knka ij cus nkska oxks dk ; ks



ikbFkkxkjl xqk] xf.kr ea, d cgr gh egRo iwZ xqk gSA vkxs dh d {kkvka ea bls , d
 l kè; o@ : i eafof/iwZl fl ¼ Hkh fd; k tk, xk A vHkh vki bl o@ rkrI ; Z dks Hkyh Hkkr
 l e> yaA



vkÑfr 6.26

bl o@ vuq kj] fd l h ledsk f=kHkqt ea d.kZ ij cus oxl dk {kski Oy nkska
 i knka ij cus oxks o@ {kski Oy o@ ; ks o@ cjkj gsrk gSA
 , d oxkZdkj dkx

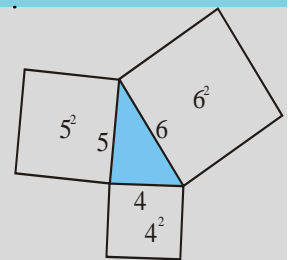
bl dh Hkqt kvka ij oxks o@ {kski Oy Kkr dhft, vkj bl l kè; dh
 0; kogkfjd : i l stkp dhft, (vkÑfr 6.26)A

;fn dkBZ f=kHkqt] ledsk f=kHkqt gS rc ml ij ikbFkkxkjl xqk iz q
 gsrk gSA vc ;fn fd l h f=kHkqt ij ikbFkkxkjl xqk l R; gS rks D; k ; g
 , d ledsk f=kHkqt gsrk \ (, d h l el; kvka dksge foyke l el; k, j dgrs
 gáA) ge bl ckr dk mlkj nss dk iz Ru djksA vc ge fn [kk, xs fd
 ;fn fd l h f=kHkqt ea dkBZ nks Hkqt kvka o@ oxks dk ; ks] rhl jh Hkqt k o@ oxl
 o@ cjkj gS rc og , d ledsk f=kHkqt gsrk pfg, A

blga dhft ,



- 4 cm] 5 cm rFkk 6 l eh ych Hkqt kvka okys rhu oxl dkx
 l s dkfV, A bu rhuka oxks o@ rhu 'kh"ks dks feykrsgq bl
 izdkj 0; ofLFkr dj jf[k, fd mudh Hkqt kvka l s, d f=kHkqt
 i ktr gks (vkÑfr 6.27)A bl izdkj i ktr f=kHkqt dks dkx
 fpflgr dhft, A bl f=kHkqt o@ rhuka dks kka dks ekfi, A vki
 n[ks fd bu ea dkBZ Hkh ledsk ugha gSA è; ku nhft, fd
 $4^2 + 5^2 \neq 6^2, 5^2 + 6^2 \neq 4^2$ rFkk $6^2 + 4^2 \neq 5^2$



vkÑfr 6.27

- mi ; q r i fØ; k dks 4 cm] 5 cm rFkk 7 cm Hkqt kvka okys rhu oxl ydj fi Oj
 nksjkb, A bl ckj vki dks, d vf/d dks k f=kHkqt i ktr gsrk A ; gk è; ku nhft, fd
 $4^2 + 5^2 \neq 7^2$ bR; kfn A

bl if0;k lsirk pyrk gsfid ikbFkkxkj l xqk oöoy rHkh iz ðr gkrk gStc fd f=khkqt ,d ledsk f=khkqt gksk A
vr% gea ;g rF; iklr gkrk gS%

;fn fd l h f=khkqt ij ikbFkkxkj l xqk iz ðr gkrk gS rHkh og ,d ledsk f=khkqt gksk A

mnkj.k 5 ,d f=khkqt dh Hkqt k, j 3 cm, 4 cm rFkk 5 cm ych gA fu/kzjr dhft, fd D;k og ,d ledsk f=khkqt gS\

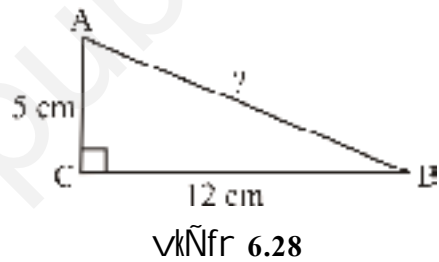
gy $3^2 = 3 \times 3 = 9; 4^2 = 4 \times 4 = 16; 5^2 = 5 \times 5 = 25$

ge n[krs gA fd $3^2 + 4^2 = 5^2$

vr% ;g f=khkqt ,d ledsk f=khkqt gSA

è; ku nhft, % fd l h Hkh ledsk f=khkqt ea d.kz l cl sych Hkqt k gsrh gSA bl mnkj.k ea 5 cm ych Hkqt k gh d.kz gSA

mnkj.k 6 ΔABC dk C ,d ledsk gSA ;fn $AC = 5$ cm rFkk $BC = 12$ cm, rc AB dh yckbz Kkr dhft, A



gy l gk;rk oö fy, vuøku l s ,d mi ;ðr vkÑfr cukrs gA (vkÑfr 6.28) A

i kbFkkxkj l xqk l j

$$AB^2 = AC^2 + BC^2$$

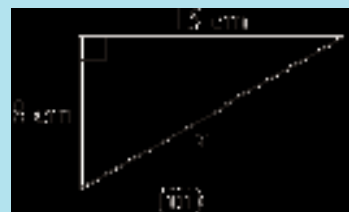
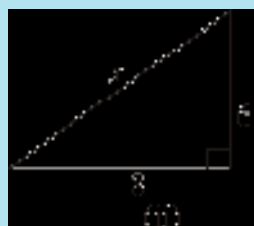
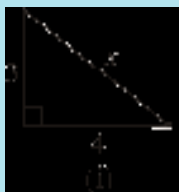
$$= 5^2 + 12^2 = 25 + 144 = 169 = 13^2$$

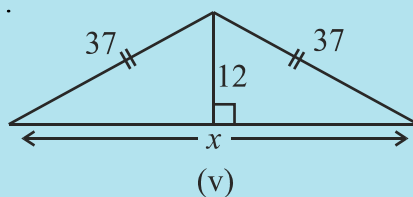
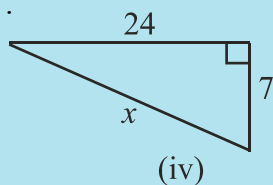
vFkkz~ $AB^2 = 13^2$. vr% $AB = 13$ gA vFkkz~AB dh yckbz 13 cm gSA

è; ku j [ka% i wkz oxz l j ;k, j igpkuus oö fy, vki vHkkt; xqku [AM fof/ iz kx ea yk l drs gA

iz kl dhft,

fuEu vkÑfr 6-29 ea vKkr yckbz x Kkr dhft, %



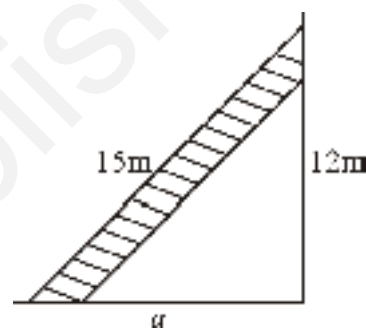


vkÑfr 6.29

ižukoyh 6.5

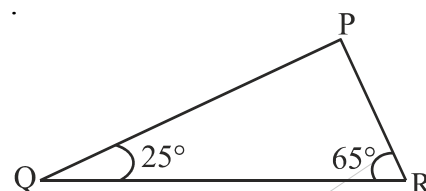


1. PQR, d f-khkqđ gšftl dk P, d ledskk gSA ;fn $PQ = 10$ cm rFkk $PR = 24$ cm rc QR Kkr dhft, A
2. ABC, d f-khkqđ gšftl dk C, d ledskk gSA ;fn $AB = 25$ cm rFkk $AC = 7$ cm rc BC Kkr dhft, A
3. nhokj ođ l gkjs ml ođ iš dñ njih ij fvdk dj 15 m ych, d lh-k Hkfe ls 12 m mppkbz ij fLFkr f[kMedh rd igpp tkrh gSA nhokj ls lh-k ođ iš dh njih Kkr dhft, A
4. fuEufyf[kr ea Hkqđkvka ođ dka ls leđ, d ledskk f-khkqđ cuk l drrs gđ\
 - (i) 2.5 cm, 6.5 cm, 6 cm
 - (ii) 2 cm, 2 cm, 5 cm
 - (iii) 1.5 cm, 2 cm, 2.5 cm



ledskk f-khkqđ gkus dh fLFkr ea ml ođ ledskk dksHkh i gpkfu, A

5. , d iM+Hkfe ls 5 m dh mppkbz ij VW tkrk gš vkš ml dk mñi jh fl jk Hkfe dks ml ođ vk/kj ls 12 m dh njih ij Nrk gđ iM+dh ijñ mppkbz Kkr dhft, A
6. f-khkqđ PQR ea dskk $Q = 25^\circ$ rFkk dskk $R = 65^\circ$. gđA fuEufyf[kr ea dka l k dFku l R; gđ\
 - (i) $PQ^2 + QR^2 = RP^2$
 - (ii) $PQ^2 + RP^2 = QR^2$
 - (iii) $RP^2 + QR^2 = PQ^2$



7. , d vk;r dh yckbz 40 cm gš rFkk ml dk , d fod.kz 41 cm gSA bl dk ifjeki Kkr dhft, A
8. , d leprkqđ ođ fod.kz 15 cm rFkk 30 cm gSA bl dk ifjeki Kkr dhft, A

I ksp,] ppkz dhft, vks fyf[k,



1. f=Hkqt PQR dk dsk P, d ledsk gSA bl dh lcl sych Hkqt k dks&l h gS\
2. f=Hkqt ABC dk dsk B, d ledsk gSA bl dh lcl sych Hkqt k dks&l h gS\
3. fdl h ledsk f=Hkqt ea lcl sych Hkqt k dks&l h gsrh gS\
4. fdl h vk;r eafod.kz ij cus oxZ dk {kski Oy ml dh yækbZ rFkk pkM/kbZ ij cus oxks oð {kski Oy oð ; kx oð cjkcj gsrk gSA ; g cS'k; u dk iæš gSA bl dh i kbFkkxkj l xqk l sryuk dhft, A

blga dhft,

Kkuo¼d fØ; kdyki

vkÑfr; ka dks tkm+vFkok rkmelj l kbFkkxkj l I kè; dks vud fof/; ka l sfl ¼ fd; k x; k gSA bu fof/; ka ea l s dñ dks , df=kr dj mlgA , d pkVZ cukdj iærq dhft, A

geus D; k ppkz dh\

1. , d f=Hkqt dh rhu Hkqt k, j rFkk rhu dks k] bl oð N% vo; ; dgykrs gSA
2. fdl h f=Hkqt oð , d 'kh'kz dks ml oð l Eedk Hkqt k oð eè; tcnq l sfeykus okys js[kk [km dks ml dh , d ekfè; dk dgrs gSA , d f=Hkqt dh rhu ekfè; dk, j gsrh gSA
3. fdl h f=Hkqt oð , d 'kh'kz l s ml oð l Eedk Hkqt k ij [khp s x, yæ dks f=Hkqt dk , d 'kh'kz yæ dgrs gSA , d f=Hkqt oð rhu 'kh'kz yæ gsr s gSA
4. fdl h f=Hkqt dk cká dks k fdl h , d Hkqt k dks , d gh vksj c<kus ij curk gSA i R; sd 'kh'kz ij , d Hkqt k dks nks i ðkj l sc<ldj nks cká dsk auk, tk l drs gSA
5. cká dsk dk , d xqk µ
f=Hkqt oð cká dsk dh eki] ml oð nks l Eedk v r% dks kka oð ; kx oð cjkcj gsrh gSA
6. f=Hkqt oð dskka oð ; kx dk xqk µ
, d f=Hkqt oð rhuka dsk kka dk ; kx 180° gsrk gSA
7. , d f=Hkqt ft l dh i R; sd Hkqt k dh eki l eku gk} l eckgq f=Hkqt dgykrk gSA l eckgq f=Hkqt dk i R; sd dsk 60° dk gsrk gSA
8. , d f=Hkqt] ft l dh dks nks Hkqt k, j eki ea l eku gk} l ef}ckgq f=Hkqt dgykrk gSA l ef}ckgq f=Hkqt dh vl eku Hkqt k ml dk vk/kj dgykrh gS rFkk vk/kj ij cus nksuka dsk , d nñ js oð cjkcj gsr s gSA

9. f=kHkqt dh Hkqt kvka l s l æð/r xq kµ

- (i) f=kHkqt dh dkbz nks Hkqt kvka dh eki ka dk ; ksc] rhl jh Hkqt k dh eki l svf/d gkrk gSA
- (ii) f=kHkqt dh dkbz nks Hkqt kvka dh eki ka dk var j] rhl jh Hkqt k dh eki l s de gkrk gSA ; a nks ka xq k] fd l h f=kHkqt dh jpuk dh l alkouk crkus eami ; ksch gkrk gð tc fd ml dh rhuka Hkqt kvka dh eki nh gkaA

10. l edk k f=kHkqt ea l edk k oð l keus okyh Hkqt k d. lz rFk vU; nks ka Hkqt k, j ml oð i kn dgykrh gðA

11. i kbFkxkj l xq kµ

, d l edk k f=kHkqt ea d. lz dk oxl = ml oð i kn ka oð oxk æ dk ; kscA

; fn , d f=kHkqt l edk k f=kHkqt ugha gsrc ; g xq k iz; ðr ugha gkrk gSA ; g xq k bl ckr dkr; djuseami ; ksch gkrk gS fd dkbz fn; k x; k f=kHkqt l edk k f=kHkqt gS ; k ughaA

