Cutubka 1aad

FISIGISKA IYO CABBIRAADA

Natiijada cutubka: Cutubkani markuu dhamaado waxaad a woodi dontaa

- ✓ Fahantid Fikrada laxidhidha Cabbir Saleedka. Kobcisid xirfadaha cabirada muga cufnaanta, iyo bedka. Kobcisid xirfadahe cabirada keynaanka, barabaxa iyo kul – qaadka
- ✓ Kobcisid xirfadaha soo saarista iyo qiimaynto loo qoondeeyo mashruucyada oo lagu daba qayo (adeegsanayo) xeerka iyo dhisida fisigiska.
- ✓ Garatid xidhiidhka ka dhexeeya dhamaan walxaha.
- ✓ Adeegsatid xadka wayn ee suurta galka k u ah Kor u qaadista aqoonta Fikradaha la xidhiidha fisigiska.

Hordhac

Midka mid ah xirfadaha ugu muhimsan ee barashada fisigiska waa cabbiraada. Fasalkii 7aad waxaad. Kusoo baratay sida loo cabbiro dhererka, aminta, iyo cufka, qalab kaladuwan baa lagu cabbiraa dhererka, amint iyo cufka soobaratay. Halbeegyada dhaqanka iyo halbeeg Qiyaas lagu cabbiro kala duwanaan shahooda. Waxa kale aad soo baratay cabbir saleedka in la cabbirayo laakiin. Waxad kajawaabi xaddi Fiisikeed isagoo kuu qeexaya cabbir saleedka asaasiga waxaa lagu magacaabaa xadi lasoodhiraandhiriyey.

Cutubkan waxaadku baran doonaa sida wax loo cabbiro iyo xisaabinta Qaybahakala duwan, muga walaxaha kaladuwan iyo cufnaanta walaxaha.

1.1 Cabbirka Bedka

Qaybtan waxad kubaran sida loo cabbiro bedka oogadiisa kala duwan.

Hawlgalka 1.1

Cabbirka dhererke iyo balaca ee Qalabkan Sosocda

	Qalabka	Dherre (m)	Balac (m)	$\ell \times w$	Halbeega
1	Fasalka 8aad fiisigiska buuga				
2	Fasalkaaga				

Maka haysataa wax fikrad ah maadada xisaabta ooku saab san taranta dhererke iyo ballala

Dhamaan oogooyinka, ha' ahaadan mid qaabsan iyo mid Qaab laawee ah laynan bay leeyihiin.

Bedka oogadu waa meesha banan ee laynka halbeega bedkuwaa mitier lab Jibaaran. (m^2). Halbeeg kale waa: cm^2, mm^2 iyo km^2

Shaxda 1.1 Xidhidhika u dhexeya SI iyo kuwa aan a hayn. SI	
$1m^2$	$10,000cm^2$
$1m^2$	$1,000,000\ mm^2$
$1m^2$	$100\ dm^2$

Hawlgalka 1.2

1. m^2 waxaad ubadashaa cm^2, mm^2 iyo km^2.
2. $1cm^2$, waxaad ubadashaa $1mm^2$, iyo
3. km^2 waxad ubadasha m^2.

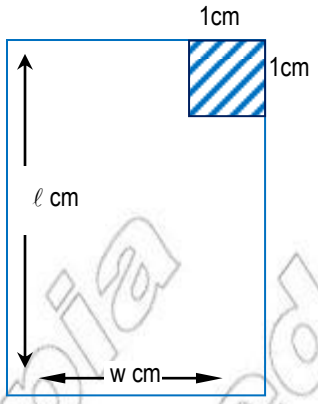
Xisaabinta bedka

Hawl golka 1.3

Raadi warqad adag u Go'na Qurubo yeryar 1cm × 1cm. Gudahaan Soo saar 10 Qurub oo laba Jibaarane ah (Sm^2) Qurubada waraaqaha iskudhaji si sentimitier labaaji baarane Qaabsan ah adoon midnakatagin meel udhaxays a buugaaga

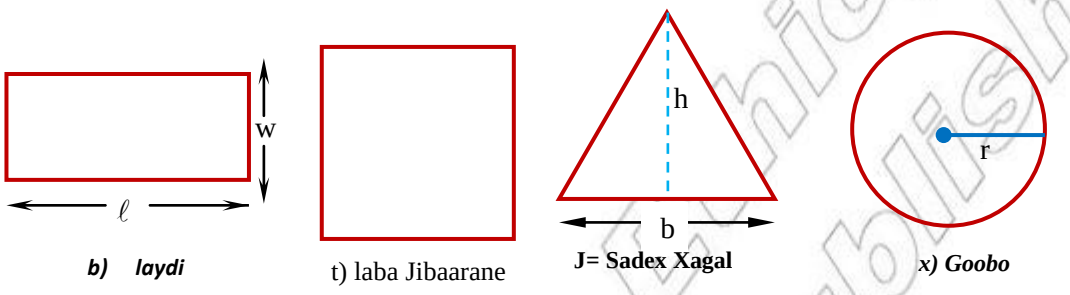
- waa imisa Qurub ku waad isticmaashay si ay udaboosho dhamaan ogada buuga?
- Isbarbardhig tiradan Qurubahawarqada notiijada $\ell \times w$ ee buugaag.

Habka aadisticmaalayso cabbirka oogadu waa mid ladhiraandhiriyey toos ahaan kaaso ah habka cabbirka ee fogaanta. Bed waxaa lagu cabbiraa iyadoo la dooranayo habaynta halbeeg labajibaarane. Cadee waaimisa halbeeg kaasooka kooban ogada waxaan garanaynaa Bedka. Maxaa lagu cabbiri dherer iyo balaca oogada markaa waxaa la eega, heerka natiijada cabbirka.



Jan 1.1 1cm x 1cm labajibaarna

Beddka oogoyinka Qaar waxay leyihiin xisaabahaan xidhidh Qaloc a KugudaJir. Waxaad soo baratey xisaab ahaan sida labajibaaranaha iyo goo bada. Kuwa sosocda nanakhtiin ahaan urogaadi bedkooda ogoyinka kala duwan. .



b) laydi t) laba Jibaarane **J= Sadex Xagal** ***x) Goobo***

Jan 1.2 Bedka Qaababkoodu way Kaladuwan yihiin

Tusaale: 1 Bedka laydiga ogada lagusiyey natijada dherer iyo balac.

Bed = dhere × balac

$A = \ell \times w$

2. Bedka labajibaarane ogada lagusiyey natijadeedu waa labada cidhif.

Bed = dherer × dherer

$A = \ell^2$

3. Bedka Sadex xagalka oogad lagusiyey natiijadeedu waa badhka salkeeda iyo Jooga. Oo La iskudhul fto

$$\text{Bed} = \frac{1}{2} \times \text{salka} \times \text{Joog} = \frac{1}{2} \times b \times h = \frac{1}{2} bh$$

4. Bedka Ogada goobada ee lagusiyey:

Bed = $\pi \times$ (Gacanka)^2

$A = \pi r^2$

Table 1.2 Qaaciidada lagu raadinayo beddka oogada kaladuwan		
Oogooyinka	**Qaaciidada**	
Laydiga	**$A = \ell \times w$**	**Bed = dhere × balac**
Labaji baarane	**$A = \ell \times \ell = \ell^2$**	**Bed = dherer × dherer**
Sadex Xagal	**$A = \frac{1}{2} \ell \times h$**	**Bed = $\frac{1}{2} \times$ salkax joog**
Goobo	**$A = \pi r^2$**	**Bed = $\pi \times$ (Gacanka)^2**

Tusaale 1.1

Waa imisa oogoda bedka miiska, hadii dhererku yahay 120cm iyo balacuna 80 cm?

Siin	weydiin	Fur - Furis
ℓ = 120 cm w = 80 cm	A = ?	A = $\ell \times$ w = 120cm $\times$ 80cm = 9600 cm^2 or 0.96m^2

Tusaal 1.2

Waa imisa bedka labajibaarane hadii cidhifkiisu yahay 2m midwalba?

Siin	Waydiin	Fur - Furis
ℓ = 2m	A = ?	A= ℓ^2 = $(2m)^2$ = $4m^2$

Tusaal 1.3

Raadi bedka salka ee dhalada hadii dhexroorka salkuyahay 4 cm. (uqaado qiimaha π=3.14)

Siin	Weydiin	Fur-Furis
Dhexrorka = 4cm $\therefore$ r = $\frac{\text{diameter}}{2}$ = 2cm	A= ?	Bedkagoobadu A = πr^2 = 3.14$\times$ $(2cm)^2$ = (3.14$\times$ 4) cm^2 = 12.56 cm^2

Hubin 1.1

1. Waa maxay bedku? Sidee loo cabiraa
2. Qorsida su'aalaha loguraadiyo bedka laydiga,laba jibaarnaha, sadex xagalka iyo goobada.
3. Qeex xidhidhka udhexeya dhexroorka iyo gacanka goobada.
4. Muuji xidhidhka u dhexeeya m^2 iyo halbeegyada kale sida cm^2, mm^2 iyo km^2.

1.2 Cabbirka Muga

Waxa xiga oo, aad baran doonaa sida loo cabbiro muga qaabsan (muga walaxda qaabsan), dareeraha, iyo walaxda qaablaawe. Dhamaan walxaha Fisikeed ee kugu xeersan waxay buuxinayaan meel. Qalabka kaladuwani waxa uuadeegimeelo kaladuwan. Meesha walaxi ay buuxisay (buuxiso) waxaalayidhaa muugawalaxda

Muga walaxdu waa inta walaxi meel buuxiso. halbeegyada mugu waa mitir sadexjibaaran (m^3)

Muga walaxda waxa lagu caddeeyaa disimitir sadex jibaarn (dm^3), sentimitir sadex jibaarn (sm^3) milimitier sadex jibaar (mm^3) I.W.M.

Shaxda 1.3 Xidhidhiika kadhexeeya halbeegyada (SI) iyo kuwa aan ahayn caalamiga	
$1m^3$	$1,000,000cm^3$
$1dm^3$	$1,000cm^3$
$1cm^3$	$1,000mm^3$

Tusaale 1.4

Imisa cm^3 buu lamidyahay $0.8\ m^3$?

Siin	Fur - Furis
$V = 0.8m^3$	$1m^3 = 1000,000cm^3$ $0.8m^3 = ?$ $\therefore V \text{ in } cm^3 = \frac{0.8\cancel{m^3} \times 1000,000cm^3}{1\cancel{m^3}}$ $= 800,000\ cm^3$

Walaxda adkaha, dareere, ama Neef sameeya intaa waxa dheer walaxda adkaha waxa noqodaa mid qaabsan ama qaab laawe ah qaabkisu sugan yahay dareere malaha qaab sugan, waxa uyeeshaa qaabka weelka sidaa darted habka la isticmaalayo muga adke, dareere , ama Neef.

Hawlgalka1.4

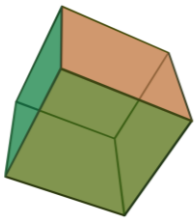
Kaladood saxibadaa adooqoraya xususyar sida loo cabiro muga

b. sanduuqa taraqa
t. Hawada fasal kaaga
j. dareere kasta
x dhagax kasta oo qaab laawe ah

1.2.1 Cabbirka Muga Qaabsan Eewalaxda Adke

Adkuhu waxa uleyahay qaab iyo mug. Qaabka adkuhu waxa uu noqon karaa qaab sugan iyo qaab laawe. Cabbirka muga qaableh:- qaabka adke waxaa siman si iskumid ah ogada bedka. Dhererka, balaca, iyo jooga walxdu waxay ubaahan yihiin cabbiraad. Marka muga waxaa lagu xisaabiyaa isticmaal ka natijada sadexdhinac (Jan 1.3 inatusayaa baloogalaydi, sadex jibaarane, dhululubo)

b. balaca laydi

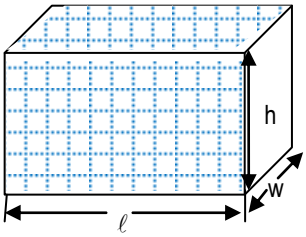


t. sadex jibaarane

J. dhululubo

Jaantuska 1.3 walxaha qaabsan

I. Muuga baloog laydi:



Jan baloog laydiga cidhifkisu yahay ℓ, w iyo h

muuga (V) baloog lay di, dherer (ℓ) balac (w), jog (h). siintuwaa

$V = \ell \times w \times h$

$V = \ell wh$

Tusaal1.5

Sanduuq tamaashiirah oo dhererkiisuyalay 4cm, balaciisuna yahay 5cm, iyo Joog of 6cm.

b. waa imisa muuga sanduuqa tamaashiirtu?

t. waa imisa halbeega tamaashirta loo baahanyahay si loo bixiyo haddi tamaashirtu $2cm^3$.

Siin	Fur - Furis
ℓ = 4cm w = 5 cm h = 6 cm muuga halbeeg tamashirta = $2cm^3$	b) v = tamaashirta sandu qeedu = 4cm×5cm×6cm = $120cm^3$ t) muga halbeeg tamaashirtu $2cm^3$. Sidaas darted tamaashirta lobaahan yahay waxa lagu xisaa binayaa "v" oo loqaybiye sdu sanduqa muuga tamaashirta

$$\text{Tirada tamaashirt} = \frac{\text{muuga sanduqa}}{\text{muuga halbeega}}$$

$$= \frac{120\cancel{cm^3}}{2\cancel{cm^3}} = 60$$

$\therefore$ waxaa loo baahanyahay 60 tamaa shiir ah

II. Muga sadex jibaarane

Baloog laydiga sadex jibaarne cidhif yadisu waa isku wada mid taa macnaheedu

dherer = balac = joog = ℓ

Muga = ℓ^3

1.2.2 Cabbirka Muga Dareere

Dareeruhu malaha qaabsugan. Markaad dareer hoose qaab kala duwan oo weelkuukujiro qaabkiisa si kastaba dareeruhu waxa uleeyahay muggo'an. Marka dareeruhu uqaata qaab weelka ukujiro, muguna dareere wuxuu leeyahay qaabka weelka uu ku jiro. Muga dareerewaxa lagu cabbiraa dhululubo (jan 1.5)

.

Jan 1.5 cabbirka dhululubad

Jan 1.6 Caagdhaloyinka eekala duwan waxay hayaan mugga biyaha eek ala duwan

Hawlgalka 1.5

Dhalada biyaha lagu shubayo cabbirka dhululubo. Haddi lacabbiro dhululubada miliitir (mL). akhrinta muga ee biyuhu waa cabbirka dhululubada

Shaxad 1.4	
1 L =	1000 mL
1 mL =	1cm^3
1m^3 =	1000 L
1L =	1dm^3

Tusaale 1.6

1. Barkad lagudabaash ayaal leh cabirade kolo ah 600cm, dhererkeeda , 300cm balac, iyo 200 cm joogeeda waaimisa muga weel biyuhu (barkada) m^3 = ?

Siin	weydiin	Fur-furis
ℓ = 600cm w = 300cm h = 200cm	muga m^3 = ?	V = ℓ × w × h marka hore halbeegyada badal taasi ℓ = 600cm = 6m; w = 300cm = 3m iyo h = 200cm = 2m. V = 6m × 3m × 2m. = **36 m^3**

1.2.3 Cabbirka Muuga Qaab Laawe

Dhagaxu waa qaab laawe ma'ufiirsatay duldhigida koobka shaaha marka malqacada sonkorta aad ku dhexrido koobka buuxa ee shaaha? Maxaa sababa kormarsita?

Hawlgalka 1.6

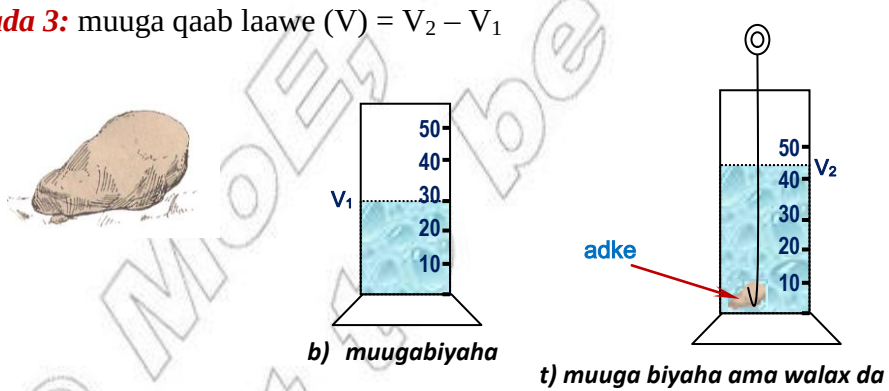
- **Kushub biyaha cabbirka dhululubad. Taxadar akhrinta (qiiyasta) biyaha iyo ubixi V_1 (Jan 1.8b)**
- **Dhagaxdhuban, ayaa lagu muquray dhagaxi dhululubad (qaabka sugan) biyaha dhex disa la cabiro dhululubada. Fiiri qiiyas ta cusub ee biyaha. Hadana akhri dhululubada. Kunamagacaw muuga V_2 (Jan 1.8t)**
- **Xisaabi $V_2 - V_1$ sharax waa maxay qiiyaastani**

Cadee muga qaab laawe

Talaabada 1: in biyoah ku shub cabbirka dhululu bada, diwaangali muga ama aan ku magacawno V_1.

Talaabada 2: kurid walaxda qaab laawe cabbirka dhululubo. Diwaangali hadana muga biyuha amaqaab laawaha aan kumagacawno V_2.

Talaabada 3: muuga qaab laawe (V) = $V_2 - V_1$

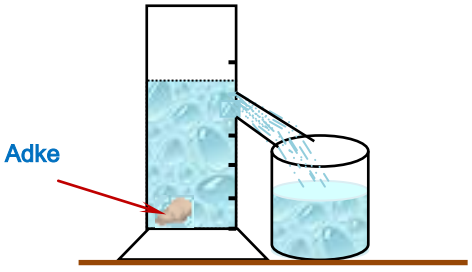


b) muugabiyaha

t) muuga biyaha ama walax da qaab laawe

Jaantuska 1.8

Laba walxood meel mawada fadhiisankaraan hal wakhti. Tusaale dhagaxa biyaha ku muquur weelka biyuhu kujiraan. Taniwaa sababta biyaha iyo dhagaxu ayna meel uwada fadhiisan. In lamidah wakht lamid ah biyuhu waxay katagayaan meel ugana tagayaan dhagaxa. Fiirjan 1.8 ama 1.9 muga barabaxa biyaha waxa uleeya hay muga adke ee biya ha lagu riday.



Jan 1.9 cabbirida muga walax da qaab laawe habka barabax

Hubinta 1.2

1. Qeex habka lagu xisaabiyo muga qaabsan.
2. Sidee baad ucabbirimuga dhululubada?
3. Sharax sidaad u cabbirtid muga dareere
4. Cadee faraqa udhexee ya adke, dareere, iyo gaaska xidhidhka muuga.
5. Sharax habka loo cabbiro muga qaab Laawe?
6. Qor halbeegyada muga adke, ama walaxda dareere.

1.3 Cabbirka Cufnaanta Walxaha

Hawlgal 1.7

Qabashada baloogu hayo alwaaxa birta mug iskumidah. Qiiyaas waxa aansoojiidan ama kukhaffiif ah. Keebaa labadoo da culus? Cabbir cufkooda iyo mugooda

Walaxda	Cufka	muuga	Cuf/muga
Baloog birta			
Balooga walaxda			

- Maxaadka fahamtey xaddiga $\frac{\text{cuf}}{\text{muga}}$?
- Walaxdee ugu weeyn $\frac{\text{cufke}}{\text{muga}}$?
- Waa imisa cufka birta ee halbeega muga?
- Waa imisa cufa alwaax halbeega muuga?
- Maxaad odhan samiga cufka, muga eewalaxda?

Hawlgalka sare waxaan ku cadaynay cufka loo qaybiyo halbeega muga ee birta iyo alwaaxi waxad heeli birtu in ay ka cuf badantahay halbeega muga alwaax

Qarsoodiga birtu wayka culustahay alwaax mug mid ahaan. Madaamu xaddiga Cuf ee halbeega muga. Xaddigan waxaa lagu qeexi Cufnaan.

Cufnaani waa samiga cufka iyo mug halbeegiba. waa xadiga cufka iyo muga summad cuf naan tu 'ρ' Waan Greek letter (xaraf Giriiga)

$$\text{Cufnaan} = \frac{\text{Cuf}}{\text{Muuga}} \; ; \quad \rho = \frac{m}{V}$$

m = Cufka walaxde

ρ = cufnaanta

v = Muuga

Waxaad u ha bayn kartaa qaaciidada 'm' iyo 'V'.

$$m = \rho.V \qquad \text{and} \quad V = \frac{m}{\rho}$$

Halbeega cufnaan tu waa kilogram loo qaybiyey mitier sadex jibaaran (kg/m^3) Tusaale cuf naanta biyuhu waa 1000 kg/m^3. Walxaha kala duwani waxay leeyi hiin cufnaan kala duwan.
Shaxda 1.5 waxay inatusay saa walxaha kala duwan

Shaxda 1.5 Cufnaanta walxaha kala duwan

Dareere		Adke	
Walxaha	**Cufnaanta gr/cm³**	**Walxha**	**Cufnaanta (g/cm³)**
Biyo	1.0	Alumunimyam	2.2
Korosen	0.8	Copper (koober)	8.9
Petrol	0.7	Dahabka	19.3
Saltiselin	1.2	Bir	8.0
Rubber	13.6	Meerkur	1.5
		Lead	11.3
		Baraf	0.9
		Silver (xaddi)	10.5
		Tin	7.3

Isticmaal shaxda 1.5 si aad uga jawaabtid su'aalaha

b. walxaha la inasiiyey keebaa cufan?

t. Mataqaan barafka sabeeya biyaha dushiisa . Qeex isticmaal fikrada cufnaanta.

j. Birtee baa ugu fudud (khafif) ah biraha lagu siye oo dhan?

Su'aalo fur-an

1. **Walaxda ugu culus cufanaan ta marka birta loo eego?**
2. **Walaxda baaka cufan biyaha?**
3. **Walaxdee baa ugu cufaanwayn?**
4. **Waa imisa cufnaanta biyaha b) kg/m^3 t) g/cm^3**

Cabbirka cufnaanta walaxda qaab laawe

Waxaad baratay sida loocabiro cuf naanta qaabsan ee walaxda siloo cabbiro cufnaanta walaxda siloo cabbiro cufnaanta walaxda qaab lawe. Waxaad ubaahan tahay cufka iyo muga walaxda qaab laawe.

Su'aalo Furan

1. **Sidee baa loo cabbiri walaxda qaab laawe cuf keed?**
2. **Sidee baa loo cabbiri muga walaxda qaab laawe.**

Waxaad cabbiri cuf adoo isticnaalaya miisaangarboole si aad u cabbirtid muga qaablawe ee adkaha waxa u le' eyahay cufka adkaha qaab lawe oo lo qeybiye muga biyaha labara bixiyay taasi waa muga biyaha la barabixiyay. Muuga adkaha qaablaawe.

$$\text{Cufnaata walaxda qaab laawe} = \frac{\text{Cufka qaab lawe}}{\text{mugga danbe muggahore}}$$

$$\rho = \frac{m}{V_f - V_i}$$

Cabbirka cufnaan ta dareere

Waxaad baratey dareeraha inuuna lahayn qaab su'gan waxa uqaataa qaabka weelka si lo cabbiro cufnaanta dareere waa inaad ta qaanid cufka iyo mugga

Su'aalo furan

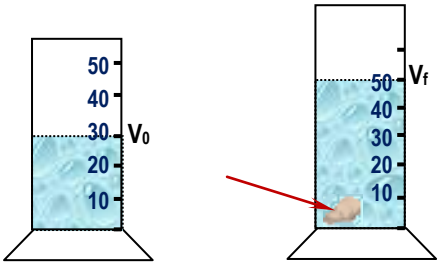
Side baad cabbiraysaa cufka dareeraha, iyo muga deeraha.

Kuwan soosocda (talaaboyinka) waxa uisticmaalaynaa cabbirka cufnaanta dareera h.

1. Cabbir cufka weel faaruq ah isticmaalna miisaan garboole m_1
2. Ku shub dareeraha mugga lagu siiyey ama cabbir cufka weelka amadareeraha iyo weelkaba m_2
3. Farqiga udhexeya m1 iyo m_2 dareere isku mid ah $(m_2 - m_1)$
4. Cufnaan ta dareerah = $\frac{m_2 - m_1}{V \text{ dareere}}$

Tusaale 1.7

1. Jan 1.10 waxa uu tusayaa dhululubo cm^3, marka qaablaawaha birta (yar) lagu rido dhululubada qiiyasta simani korbay ukici Cuf Birtu 150g waa imisa cufaantu



Jan 1.10 habka barabixinta cabbirka muga

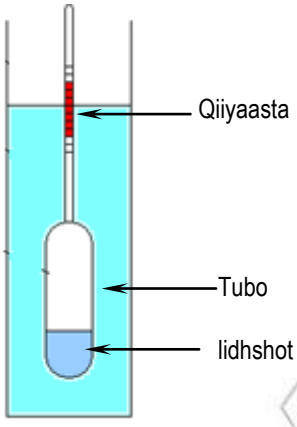
Siin	weydiin	Fur-furin
m =150g	ρ = ?	$\rho = \frac{M}{V} = \frac{150g}{20cm^3}$
$V_1 = 30cm^3$		$= \mathbf{7.5g/cm^3}$
$V_2 = 50cm^3$		
$\Rightarrow V = V_2 - V_1 = 50cm^3 - 30cm^3$		
$= 20\ cm^3$		

Haydiromitier

Hawlgalka 1.8

1. **Saaxibadaa kaladod (kuwafasalka) sidee baad ucabiraysaan cufnaanta dareeraha side bay ku kula garanayaan macaanaa mise waabiyo (sideebay dadku kala gartaan macaana mise waabiyo).**
2. **Waamaxay hy dromiter?**

Hydro mitr waa dhalo dhululubo ah culayskeedu waa salka ama dhuundhuuban baa xagsare kagataal



Jaamtiska .1.11 hydromitier

Si loo cabbiro cufnaanta dareeraha waxaa. u baahan tahay hydiromiter sabeey dareerah iyo jooga walaxdu liqayso. Tusaale cufnaanta caanaha waxaa lagu cabbiri hydiro mitir.

Cufnaanta caanaha way ka yar tahay qoton dheeradka hydiromiter ka quusa cufnaantayar ee caanaha aad bayuga Qotan dheer tahay. Tasoo marka hydromitirka qusa (caanuhu waa biyo oo kale marka cufnaantu yaraato amat duufaanka marka cufnaantu waynaato).

Muhimada aqoonsiga qalabka cufnaanta

1. Dayaarad, waxay ku soco taa ijinada, walxaha baska, Iwm way adag yihiin laakiin culusyihiin. Qaar kasameysan cufnaanyer. Tusaale, Almuniyam waxa uuleeyahay 2.7 g/cm^3. Waa kaweyn yahay birta ($\rho_s = 7.7g/cm^3$).
2. Cufnaatu waa muhiim si aad ugucadaysid iskudar ka walxaha. Tusaale cufnaanta dahabku 1.9.3 g/cm3. Dahabku marka loo ego birah kale cufnaatisu way ka yar tahay.

Hubin 1.3

1. Waamaxay cufnaantu?
2. Cadee xidhidhka udhexey cufka, muuga iyo cufnaanta?
3. Sidee baan ucabbirnaa
   - b. adkaha qaabsan
   - t. adkaha walaxda qaab laawe
   - j. dareer
4. Sharax sida uushaqeyo hydrometer.

1.4 Tibaaxda Dhaymanshinka (dhinacyada)

Xaddiiga fiisikeed. (dhameshinke) xaddi fiisiked waxa laga tixraacaa xaddi saleed ka as – aasiga halbeegiisa intuu ka kooban yahay.

Xaddikastoo lagu cabbirayo cufka waxaan odhaneyaa dhemeshinka cufka, Kan waxa lagu sharaxaa summad [m] sidookale xaddi kasta kaasog cabbira dhererka wuxuu yahay dhameeshin (dhinacyada) dherer (L) xaddifiisiked ookasta waxa lagu cadeeyaa weedhaha as – aasiga (saleedka) ama xaddisaleed ka habka halbeeg nimo M, L, T waa laisticmaali si u umatalo cufk,a dhererka, aminta isdabajogah. Awood habeeg saleedku waxa loo isticmaali raadinta xaddi fiisikeed ee layidhaa xadiga dhinac yada.

Tusaale dhinacyada bedka = dhererxdhere, waxay [L^2] dhinacyada xadigada fiisikeed waxa uu inatusi in ay xidhidh leyihiin su'aala hoodu, siay uno qo daan xaddi saleed.

Tusaale haddicabbirsaleedka xawaare (V) = [LT^{-1}] waxay utaag an tahay xawaare oo loo qaybiyo dherer, amin.

Xaddiyada qaarwaxaa lagu caddeeyaa tirada aan kusaleysneyn, halbeegyadan xaddiyadani waa dhinacyo laan tusaale, marka loo ego cufnaanta (labar bardhigo) walxaha dhinacyada la'aan ah. Halbeeg malaha ma'haa. Abdo makinaded iyo saamiga kaynaan ku waa xaddiyo dhinaceed. Makanikis. Mamagcaabikartaa xaddiyo kale oo dhinacyo la'an ah.

Shax 1.6 Tibaaxda dhinacya da xaddifiisiked

Halbeeg as aasiga			Halbeega la soo dhiraan dhiriyes		
Xaddi, Fii,	Halbeega	Dhincyal	Xaddi Fiisikeed	Halbeeg	Dhinec yadae
Cuf	Kilogram	[M]	Bed	m^2	$[L^2]$
Dheerer	Mitir	[L]	Muug	m^3	$[L^3]$
Amiin	sekan	[T]	cufnaan	$\frac{kg}{m^3}$	$[ML^{-3}]$
			Xawaare	m/s	$[LT^{-1}]$
			xoog	$kg.m/s^2$	$[MLT^{-2}]$

Halbeega lagadhiraandhiriyey oo kusaleeysan xadisaleed halbeeg siyaabo kala duwan, waxay ku wareegayaan hal xaddisdaleed halbeegii.

Talaabadu ookale dhinacyada halbeegyada waxaa lagu cadeeyaa guud'ahaan $k(M)^x (L)^y (T)^z$. halka kaykatahay x, y, iyo z ayutaagan yihiin amin intee le ega ayaa su'aalaha halbeega kusalaysan. Tusaale xoogu waa 10N waxaa loqori 10 MLT^2

Halka k = 10, x = 1, y = 1, z = -2 Qiimaha x, y, z waxa laguheli qeexida xadifiisiked awooda halbeeg saleedku waxa uxidhidh laleya hay halbeeg

Shaxda dhinacyada ugu muhimsan eexaddi fiisiked	
Xaddifiiskeed	**dhinacyaale**
Keynaan	**$[LT^{-1}]$**
Momantam	**$[MLT^{-1}]$**
Karaar	**$[LT^{-2}]$**
Tamar	**$[ML^2 T^{-2}]$**
Firguanci	**$[T^{-1}]$**
Awood	**$[ML^2 T^{-3}]$**
Danab	**[AT]**

Tusaale 1.8

1. **Bed:** Bedka labajibaarane, ee dhinacyadiisu kalayihiin 1m × 1m = $1m^2$ kan halbeeg labajibaarane dherer lagabilaabo (L), dhinacyadiisa (L) · (L) = L^2 sidoo kale bedka laba dhinac leh dhererkiisu.
2. **Mugga:** mugga 1m × 1m × 1m = $1m^3$ mugga sadexjibaarane dhinac yada
   [L] [L] [L] = $[L]^3$. Muuga dhinac yaal.
3. **Cufnaan:** $[M]^1 [L]^{-3}$
   Cufnaan $\frac{\text{Cuf}}{\text{Mugga}} = \frac{[M]}{[L^3]}$
   $= [M]^{+1}[L]^{-3}$

Isticmaalka dhinacyada

Weedhkasta oo sax ah fiisiked waa iskumid dhigandaded isticmaalka xaqiiqda maxa layidha dhinacyo

Su' aalaha fiisikeed ee saxda ah iyo halbeega mid walba waxay soobaxaan hadii aanay islee keyn, markaa isbadalka habka halbeeg tirada way is badali taaso ku saleysan isbadalka xaqiiqda. Su' aasha tirada halka aymarka hore ka ahayd.

i) Isku badalka halbeega

Marka habab kala duwan la isticmaalayo halbeegyada iskumid baa loo isticmaali habka dhinacyada kusiinaya isku badalka. Xaddiyada kale ee lasoo dhiraan dhiriyey ee halhabeega.

ii) Hubinta su'aalaha

Lagabilaabo su'aalaha fiisikeed dhinacyada, iskumidka ah weedhaha aan saxda ahayn horay bay ugu.

iii) Dhinacyada lamuujinayo (dhinacyada la qaadaa dhigo)

Waamid noo suurtoobayn in lamujiyo sida fisikeed waxa laga yaabaa in xidhidh uu laleeyahay

Hubin 1.4

1. **Maxaadka fahmaysaa dhinacyad tibaaxida.**
2. **Tibaaxida dhinacyada bedka muuga, cufnaan, xawaare, karaar, xooga, hawsha, iyo Awood.**

1.5 Qormo Saynis

Hawlgalka 1.9

Cabbirka, jooga, balaca, dhererka xisaabi fasalkaag a cm ahaan mugga fasalkaag.

i) m^3 ii) mm^3 iii) km^3

Mafahantey baraamijka ubadalida muga qolka halbeegyada sare.

- **Qeex faaiidada iyo faaido darada loo qorayo muga halbeeg yada sare.**
- **Mataqaan habkale oo loo qoro mugga**

Sida cad markaad qabaneysid Hawlgalke 1.9 waxa ku so maraya (aad soo martay) barmaaniijyo

- Tirada way badantahay qoraal keedu
- Tirada waxaa lagayaasaa in kor looqaado meeshedeedii
- Khaladka waxa lagayaabaa in la akhriy tiro eberah Iwm

Kasoo qaad fogaante qoraxda ilaadhulka inay tahay 150 milinon km. waana tan qoraalkeedu

s = 150,000,000km halka "s" ay utaagantahay

fogaanta fogaantan waxaa looqori

mitier, s = 150,000,000,000 m

sentimitir, s = 15,000,000,000,000 cm,

milimiter, s = 150,000,000,000,000 mm

ma'ufiirsatay faraqa in aad ka hadasho qoraalka tirada badan? Ma akhriin kartaa tiradan sentimitier keeda ama milimiterkeda sidoo kale qoraal ahaan, tirada yar, waxaad ubaahan tahay ebero badan. Isticmaalka tirooyinka ku celcelinaya waahawsha ladhameenayo boogsiiga ee buuga ee bugaaga sidaa dardeed, habka fu'dud ee lo qoro tirooyinka waawayn ee lobaahan yahay. Qormosaynis

Qormosaynis waa habka loo qoro tiro aad u badan iyada oo la isticmaalayo jibaarada toban looqoro tiro aad uwayn ama tiroyin aad uyar isticmaalka tirooyin ka 10 xasuus naw aqoontaada xisaabeed oo looqoro tirooyin ka Jibaarka 10.

Qormosaynis waa soo qudbinta xaddi-fisikeedka habka $a \times 10^n$. halka 'a' aykatahay tirada udhaxaysa 1 iyo 10 iyo "n" tirada abiyoone

Qormo saynis, waa kaliya ebarada, (tiro) Godka (digit) waxaa hadhi bedixda (xaga hore) ee barta jajabtoban laha. Si loogu hagaajiyo meesha barta ay katagtay si loo qabto waa in aad isticmaashid saltobanleh.
Tirada tusaalaha xaga sare kusu'gan waxa loo qori habka qormosayniska.

$s = 1.5 \times 10^8$km
$s = 1.5 \times 10^{11}$m
$s = 1.5 \times 10^{13}$cm
$s = 1.5 \times 10^{14}$mm

Su'aalo furan

Ubadal tirooyin kan soosocda qormo saynis
a) 300,000,000 cm
b) 0.000,000,000,000,128 cm

Horgaleyaal

Waxaad soobaratay in uujiro halbeegyo loo isticmaalo xadiyada saleed ama lasodhiraan dhiriyey. Sayniyahanadu waxay ogaadeen in jibaarada toban ee qormo saynis ku ayna kuhaboonayn qoraal ka. Sidaasdardeed, waxay siiyen summado qaarkamid ah jibaarada toban.

Horgalayaasha ay kujiraan jibaarkatoban kuwaas oo ah, dhufsanayaal iyo dhufsanyaal hoosaado. Summada loo isticmaaley jibbarada tobon waxaa layidhaa horgalayaal Erayga "Horgal" micnihisu waxaa shay ladhigo sheykale hortiisa sida magaciisu sheegayo, horgalaha waxaa ladhigaa halbeegyada hortooda.

Shaxda 1.8 waxay ina tusinaysaa horgalayaasha Dhufsaneyaasha ay wadaagaan qaarka mid ah iyo dhufsane – hoosaadada. Tusaale ahaan xaddiga 5kg, m waa summada mitir, xarafka "k" waa horgale u taagan 10^3.
Haddaba, $5\text{km} = 5 \times 10^3$ m.

Shaxda 1.8 Horgaleyaasha halbeegyada			
Horgale	summad	Isirka legu dhuftay halbeegasalka ah	
Tera	T	10^{12}	Dhufsaneyada
Giga	G	10^{9}	
Mega	M	10^{6}	
Kilo	k	10^{3}	
Hegtar	h	10^{2}	
Dici	d	10^{-1}	Dhufsaneyaal hoosaad
Senti	c	10^{-2}	
Milli	m	10^{-3}	
Maykro	μ	10^{-6}	
Naano	n	10^{-9}	
Biicu	p	10^{-12}	

Hubinta (xaqiijinta) 1.5

1. Maxaan uga jeednaa qormo saynis?

   Qor 1,000,000 w

   1,000 m

   0.001 sm Adigoo isticmaalaya qormo saynis

2. Sharax isticmaalka qormo sayniska.
3. Bixi waxoogaa tusaaleyaal gacan ka qabad ah oo la isticmaalayo horgale.
4. Waa maxay horgalaha loo isticmaali karaa si loo qoro;

   b) 1,000,000 (hal milyan)

   t) 1,000,000,000 (hal – bilyan))

   j) $\frac{1}{1{,}000{,}000}$

   x) $\frac{1}{1{,}000}$

Soo koobbidda cutubka

Cutubkan waxaad ku soo baratay in

- Bedku Dushu uu yahay gobolka ku xidhan garaaf xoodan. Hababka loo isticmaalo cabbiraada bedka dulaha waxaa laga soo dhiraadhiriyey Hababka cabbiraada fogaanta. Bededka qaarka mid ah walxaha qaabka leh waa
  1. Bedlka dul – laydi ah = dherer × Ballac
  2. Bedka labajibbaarane = ℓ^2
  3. Bedka du – seddexagal ah = ½ (bh)
  4. Bedka dul – Goo bo ah = πr^2.
- Halbeega caalamiga ah (SI) ee bedku waa mitir (m^2) labajibbaaran.
- Mugga walaxi waa meesha ay buuxiso walaxdo Halbeega caalamiga ah ee muggu waa mitir (m^3) seddex – jibbaaran..
- Mugga walax leh qaab - leydiyeed = ℓwh.
- Mugga walax leh qaab - seddexjibbaarane = ℓ^3.
- Mugga dareeraha waxaa lagu cabbiri karaa, in la isticmaalo dhululubo cabbiran, mugga walxaha qaab – laawaha ah waxaa lagu cabbiri karaa in lagu dhax – rido Dareere (Barabaxa).
- Cufnaantu waa xaddiga ama qiyaasta cufka halkii halbeeg ee mug ah. Qaaciidada cufnaantu waa $\rho = m/V$.
- Cufnaanta walxaha leh qaabka waxaaa lagu heli karaa in la cabbiro cufkooda iyo muggooda.
- Haydaroomitir waa qalab lagu cabbiro cufnaanta dareereyaasha.
- Dhinacyada xaddiyada fisikeed waxay ina tusayaan, sida xaddigu uu xidhiidh ula leeyahay xaddi saleedyada. Qormo saynisku waa ji dku haboon si loo qoro ama muujiyo qiimeeyayaasha cabbirada si loogu dhigo qaab xisaabfalo xisaabeed. Horgaley aashu waa jibbaarada 10, ee ku qoran halbeegyada hortood.

Nakhtinka su'aalaha iyo masalooyinka

I. Ku qor "Run" haddii weedhu run tahay, "Been" haddii weedhu been tahay.

1. Hal mitirlabajibbaarani wuxuu la mid yahay toban kun oo sentimitir labajibbaaran (10,000 sm^2)
2. Dhululubada cabbiran waxaa loo isticmaalaa cabbirka mugga dareeraha.
3. Mugga walxaha qaab laawaha ah waxaa lagu go'aamiyaa ayadoo la isticmaalayo miisaanka.
4. Haydaromitir waa qalab ku salaysan in lagu cabbiro mugga dareeraha

II. Ka jawaab su'aalahan

1. Qeex tibxahan iyo weedhahan soo socda.
   b. Bed x. tibaaxaha dhinacyada
   t. mug kh. Qormo saynis
   j. cufnaan
2. Sharax sidaad u helikarto
   i) Bedka dusha b. laydi t. seddexagal
   ii) mugga adke qaablaawe ah
   iii) cufnaanta dareeraha
3. Waa maxay isticmaalka haydaromitir?
4. Sharax faa'iidada qormo saynis.
5. Waa maxay horgaley aasha loo isticmaalaa si loo qoro dhufsane yaasha tirooyinka?

III. Masalooyin laga shaqeynayo

1. Sanduuq ballaciisu yahay 30sm dhererkiisuna yahay 40sm, joogiisuna yahay 25sm. Raadi
   b. Bedka salalkiisa
   t. mugga sanduuqa
2. Marka lagurido 10 qadaadiic ah dhululubo heerka biyuhu waxay ko u kacaan 47ml ilaa 100ml waa maxay celceliska mugga senti kastaa?
3. Waa maxay bedka shaxan laydiyeed cabbirka dhinacyadiisu yihiin 27.3sm iyo 17.5sm?
4. Ku xisaabi – xisaabfaladan qormo-saynis (adigoo isticmaalaya aqoontaadii xisaabeed)
   b. $2.7 \times 10^2 N \div 3.6 \times 10^{-4} m^2$
   t. $3.9 \times 10^{-2} m - 2.3 \times 10^{-3} m$
5. U qor kuwan soo socda i) Qormo saynis
   ii) Horgaleyaasha
   a. 15,000,000,000 kg
   b. 0.00000189 m
   c. 0.000,000,000,000,000,000,0030 seken
   d. 6000,000,000,000,000,000,000,000 km

6. Xisaabi kuwan soo socda

   $(8.60 \times 10^{5}) \times (6.17 \times 10^{-2}) \div (1.79 \times 10^{-4})$. U qor jawaabtaad qormo saynis Adigoo kusoo ururinaya barta jajabtobanlaha dabadeed hal – god (isticmadal Aqoontaadii hore ee xisaabta).

7. Xisaabi dhinacyada madoor soomaha cuf – isjiidadka G,halka

   $F = \frac{Gm_1m_2}{r^2}$.

8. Barta uu dhaco qurub maraya dhidibka x dushiisa waxaa ina siiya isle'egta $x = at^2 - bt^2$, halka t tahay aminta, Raadi qiimayaasha (dhinacyada) a iyo b.

9. Hubi jiritaan dhinacyada isle'egyadan soo socda

   a. $v = v_o t + \frac{1}{2}at^2$

   b. $v^2 = v^2_o + 2$ as, halka s ay tahay fogaanta ay socoto aminta t, v_o iyo v ay kala yihiin keynaanada bilowga iyo dhammaadka, "a" ay tahay karaar