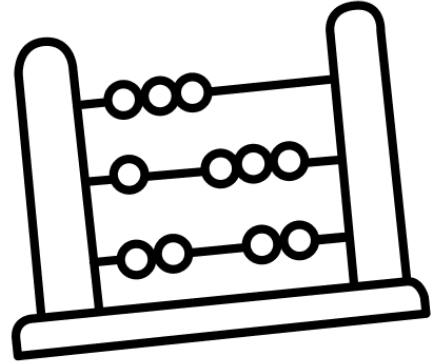


# Qaabaynta garaafyada

## Maths

Cutub: Matoorka garaafyada



## Natiijo

Waxaan ku qaabayn karaa xaaladaha nolosha dhabta ah garaaf ahaan.

## Erayada muhiimka ah

Heerka isbeddelka (rate of change) waa sida dhakhsaha leh ee hal doorsoome (variable) u isbeddelo marka la eego mid kale.

Jiirada (gradient) waa cabbirka sida uu xariiqu u taagan yahay, waxaana lagu xisaabaa helista heerka isbeddelka jihada  $y$  marka loo eego jihada togan ee  $x$ .

### Qaabaynta garaafyada



Akhriska garaafyada masaafada-waqtiga

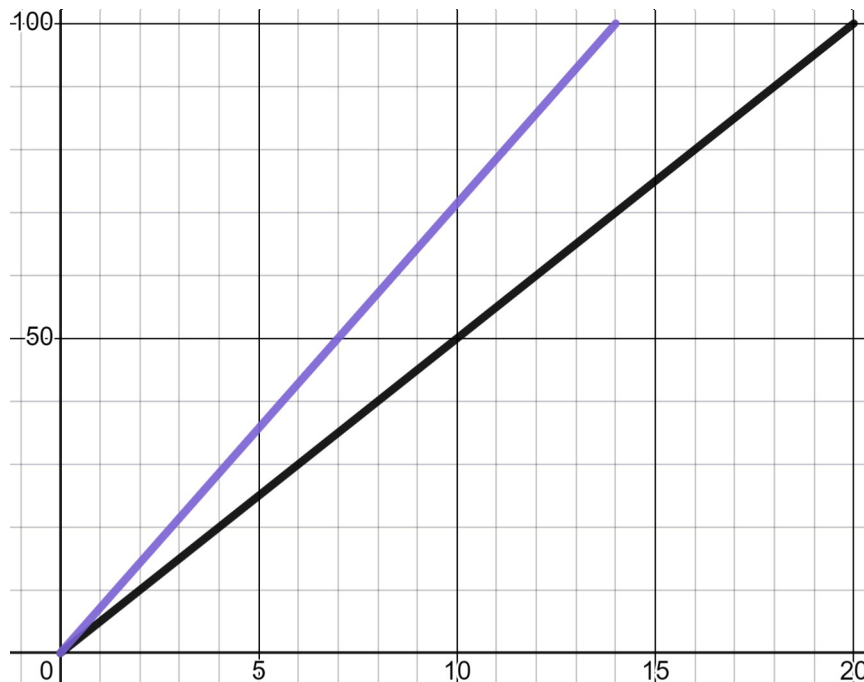


Sawiridda garaafyada masaafada-waqtiga

Garaafyada masaafada-waqtiga waxay qaabayn karaan xaalado badan oo nolosha dhabta ah waxayna noo sheegaan waxyaabo faa'iido leh.

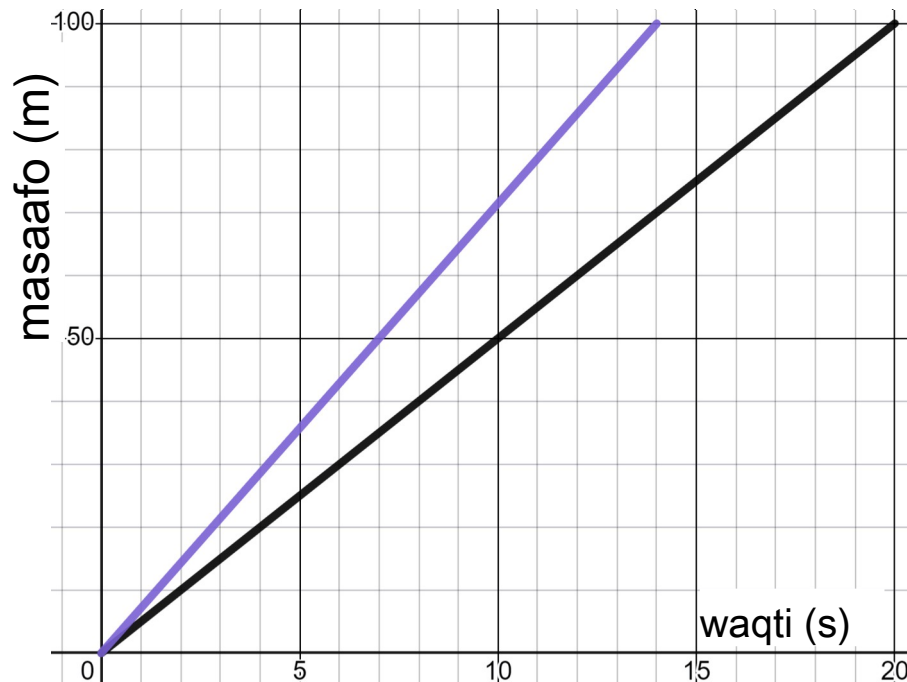
Suad waxay diiwaangelisay xogteeda fasallada jirdhiska (PE) waxayna sawirtay garaafkan.

Taasi waa waxaan sameeyay dhawr sano ka hor. Tan waa waxa aan hadda sameyn karo.



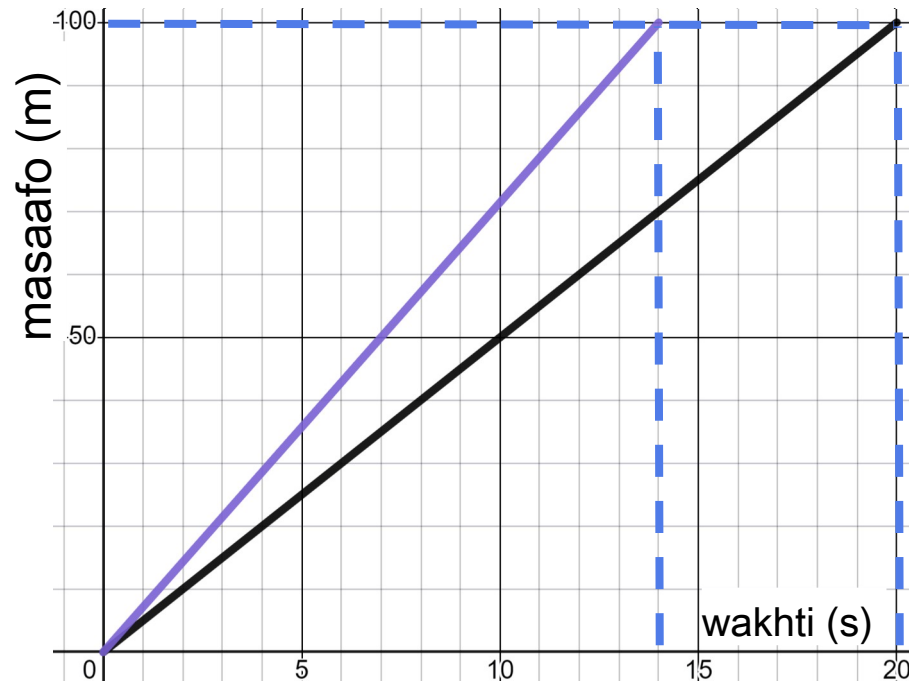
Maxaad ka akhriyi kartaa garaafkan masaafada-waqtiga?

Taasi waa waxaan sameeyay dhawr sano ka hor. Tan waa waxa aan hadda sameyn karo.



Maxaad ka akhriyi kartaa garaafka (distance time graph) kan?

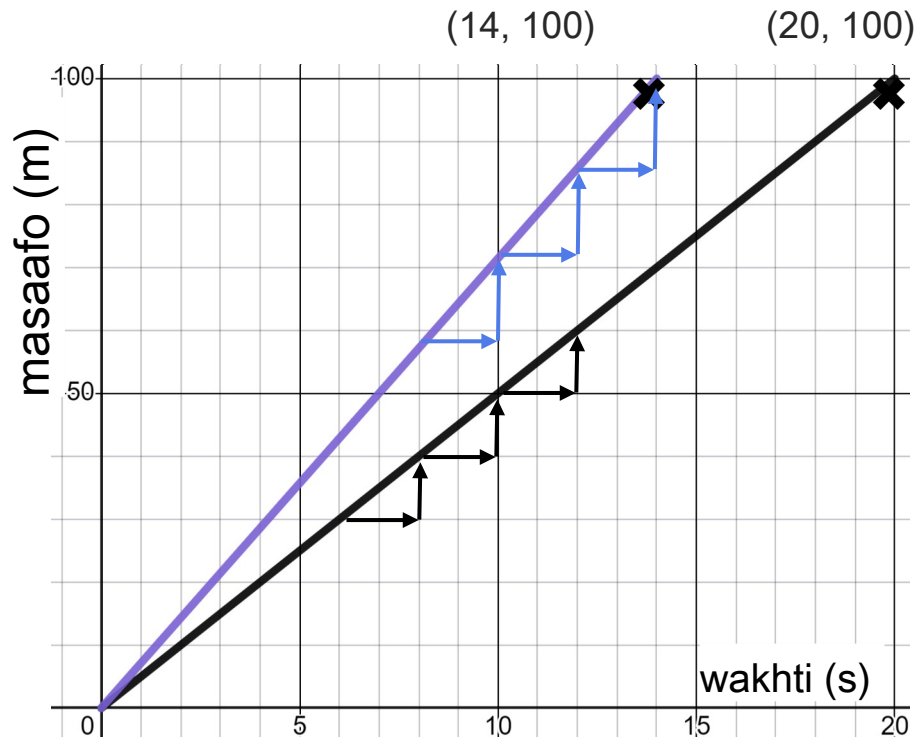
- Waqtiga Suad waa isbeddelay.  
20 s hoos ugu dhacay 14 s



# Akhriska garaafyada (distance time graphs)

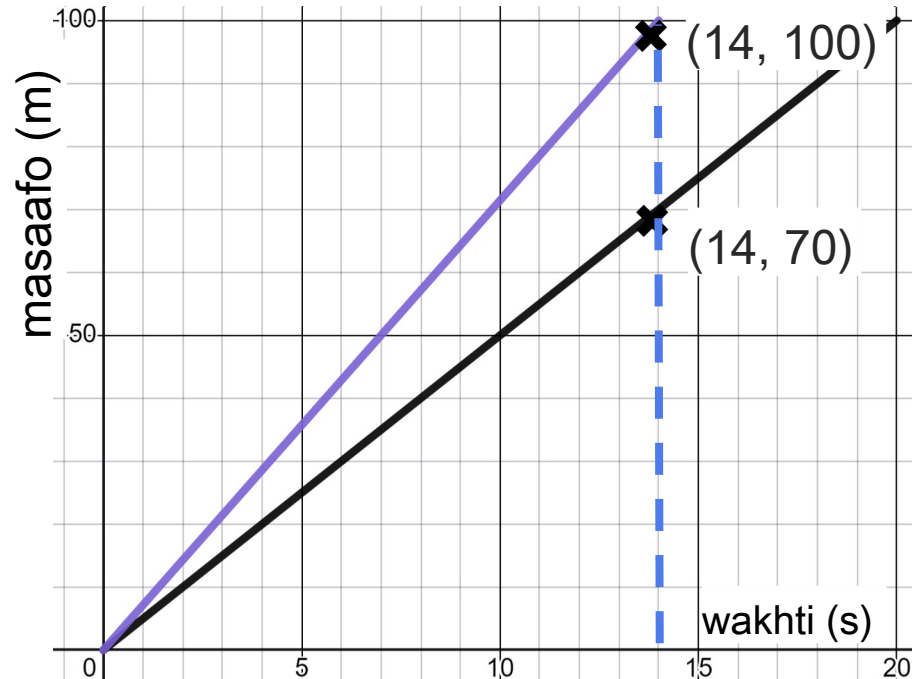
Maxaad ka akhriyi kartaa garaafka (distance time graph) kan?

- Suad waxay ku orday 100 m labada jeer.
- Waqtiga Suad waa isbeddelay. 20 s hoos ugu dhacay 14 s
- Labada xariiqba waxay leeyihiin jiiis (gradient) isku mid ah oo muujinaya heer isbeddel/xawaare joogto ah.



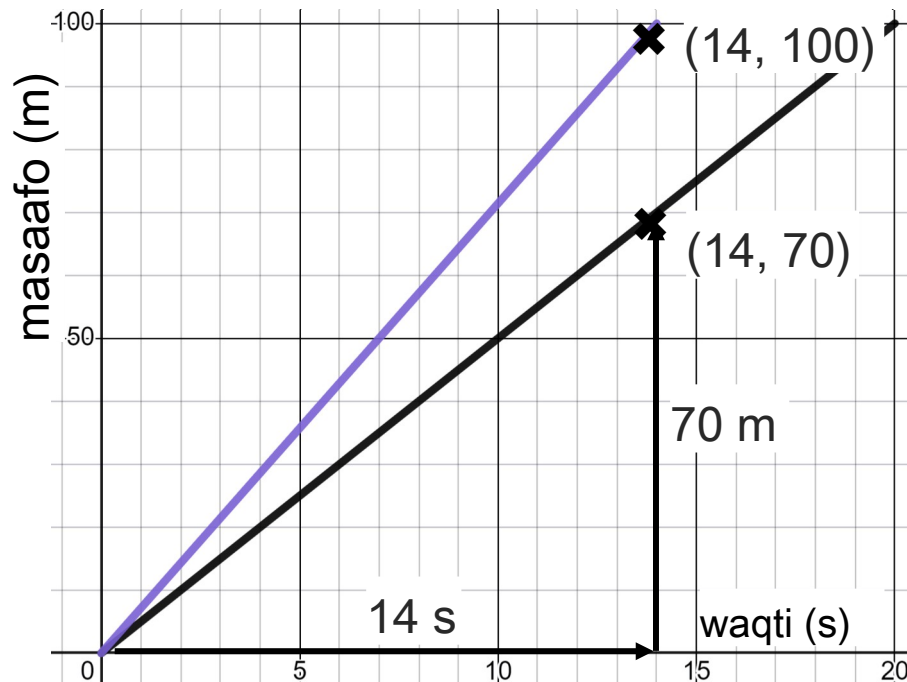
Maxaad ka akhriyi kartaa garaafka (distance time graph) kan?

- Suad waxay ku orday 100 m labada jeer.
- Waqtiga Suad waa isbeddelay. 20 s hoos ugu dhacay 14 s
- Labada xariiq waxay leeyihiin jiiro/xawaare isku mid ah.
- Jiirada ka taagan waxay muujinaysaa xawaare ka weyn.



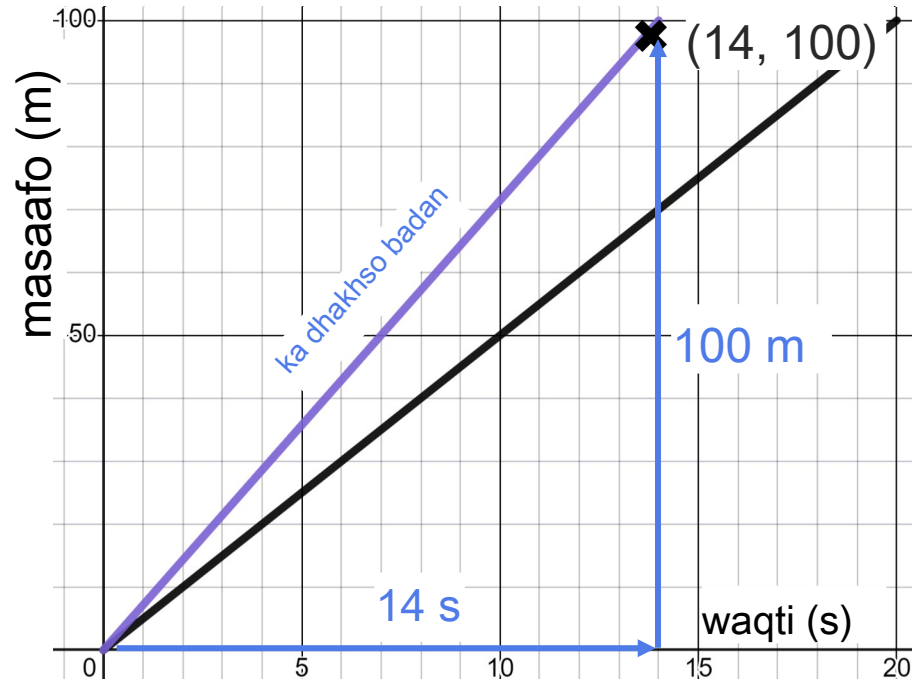
## Maxaad ka akhriyi kartaa garaafka masaafada-waqtiga?

- Suad waxay ku orday 100 m labada jeer.
- Waqtiga Suad wuu isbeddelay. 20 s hoos u dhacay ilaa 14 s
- Labada xariiq waxay leeyihiin jiirro/xawaare isku mid ah.
- Jiirada ka taagan waxay muujinaysaa xawaare ka weyn.



## Maxaad ka akhriyi kartaa garaafka masaafada-waqtiga?

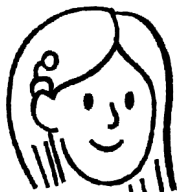
- Suad waxay ku orday 100 m labada jeer.
- Waqtiga Suad wuu isbeddelay. 20 s hoos u dhacay ilaa 14 s
- Labada xariiq waxay leeyihiin jiiro/xawaare isku mid ah.
- Jiirada ka taagan waxay muujinaysaa xawaare ka weyn.



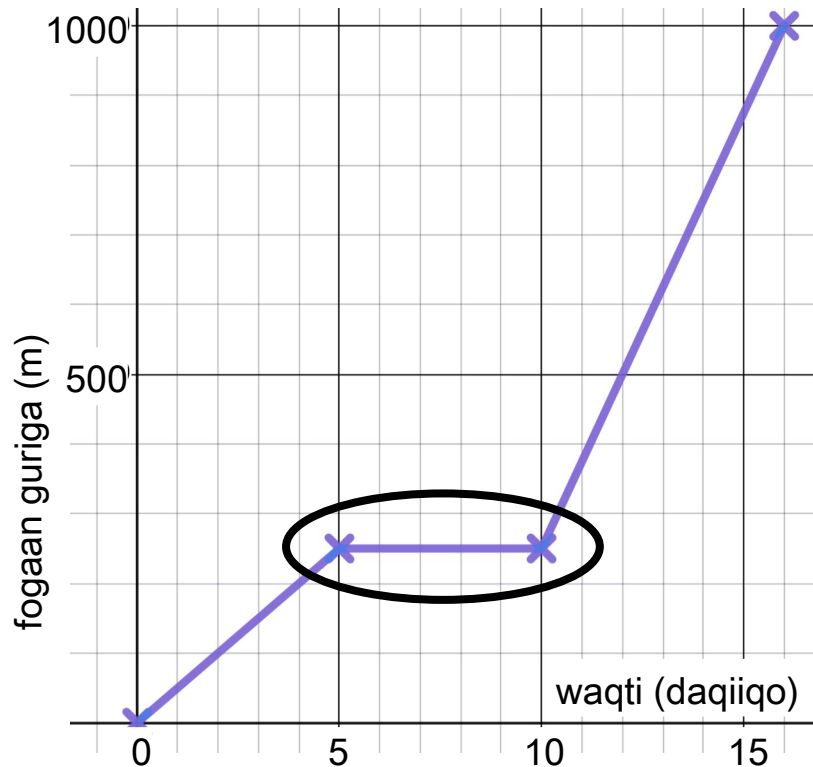
## Akhriska garaafka waqti-fogaan (distance-time graphs)

Saacadda caqliga leh ee Suad waxay raadraacdaa socodkeeda iskuulka.

Daqiiqaddan waxay u muuqataa mid aan caadi ahayn garaafka.



Maxay tahay waxa halkan ku dhacay?

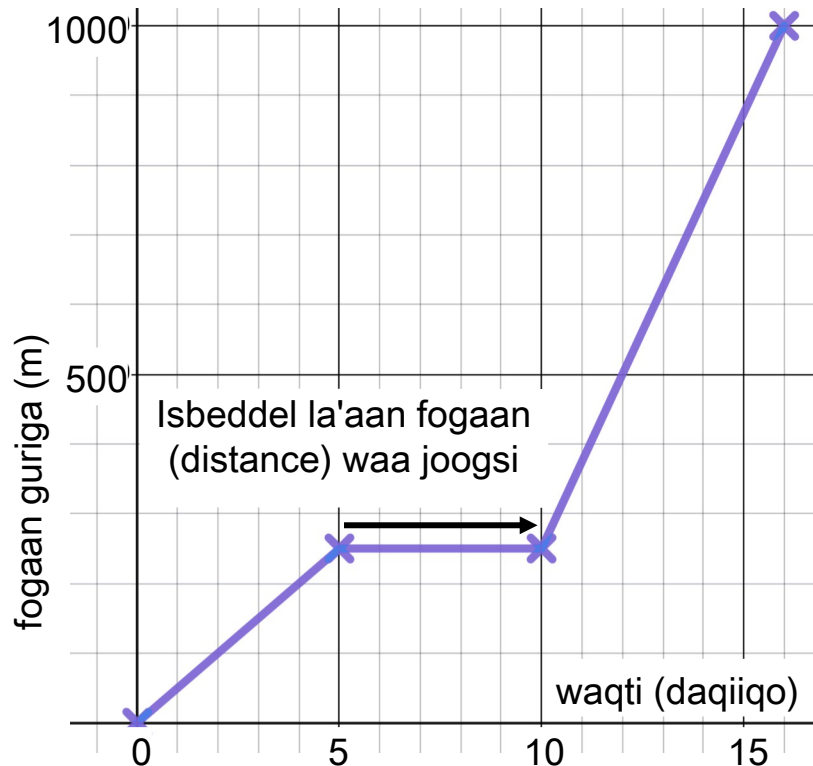


Saacadda caqliga leh ee Suad waxay raacdaa socodkeeda dugsiga.

Daqiiqaddan waxay u muuqataa mid  
aan caadi ahayn garaafka.

Waa runti! Gradient (gradient) eber ah  
macneheedu waa inaan istaagay.

Waa markaad istaagtay inaad i soo  
qaaddo.



# Akhriska garaafka waqti-fogaan (distance-time graphs)

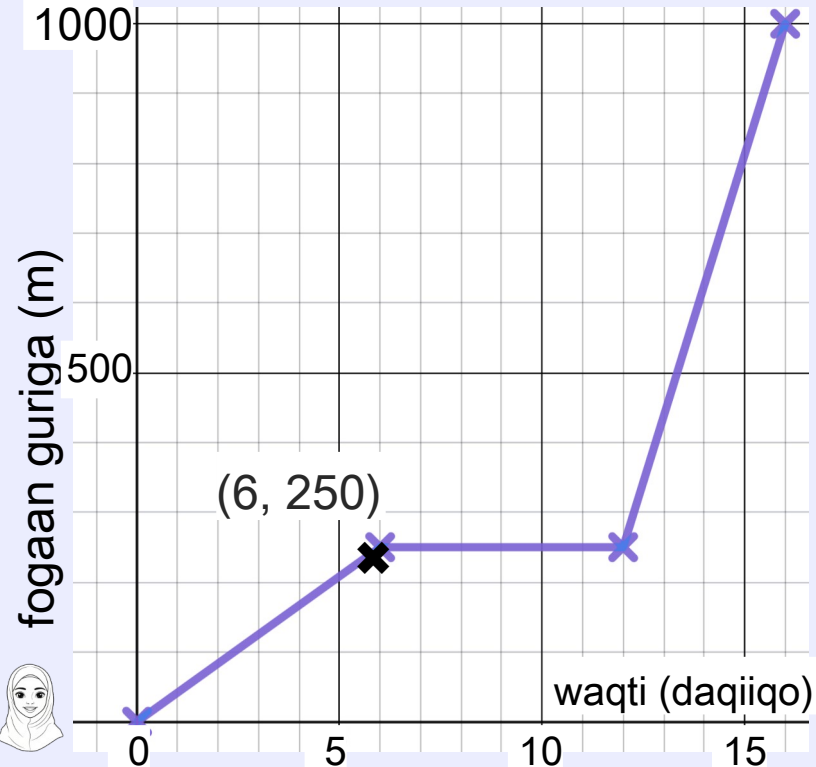
Maalintan intee ayay ku qaadataa Suad inay gaadho guriga Isra?

**a** 250 daqiiqo

**b** 6 daqiiqo



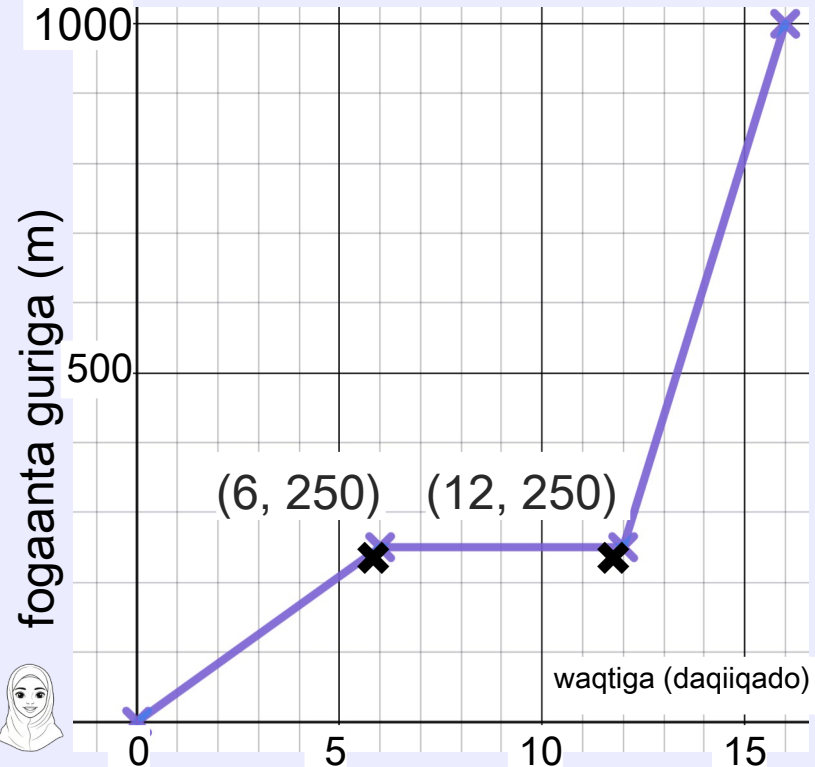
**c** 12 daqiiqo



# Akhriska garaafka waqti-fogaan (distance-time graphs)

Maalintan immisa daqiiqo ayay Sofia ku sugaysaa guriga Izzy?

- a** 0 daqiiqo
- b** 6 daqiiqo ✓
- c** 12 daqiiqo



# Akhriska garaafyada fogaanta-waqtiga

Maxay noo sheegaysaa isbeddelkan gradient-ka?

**a**

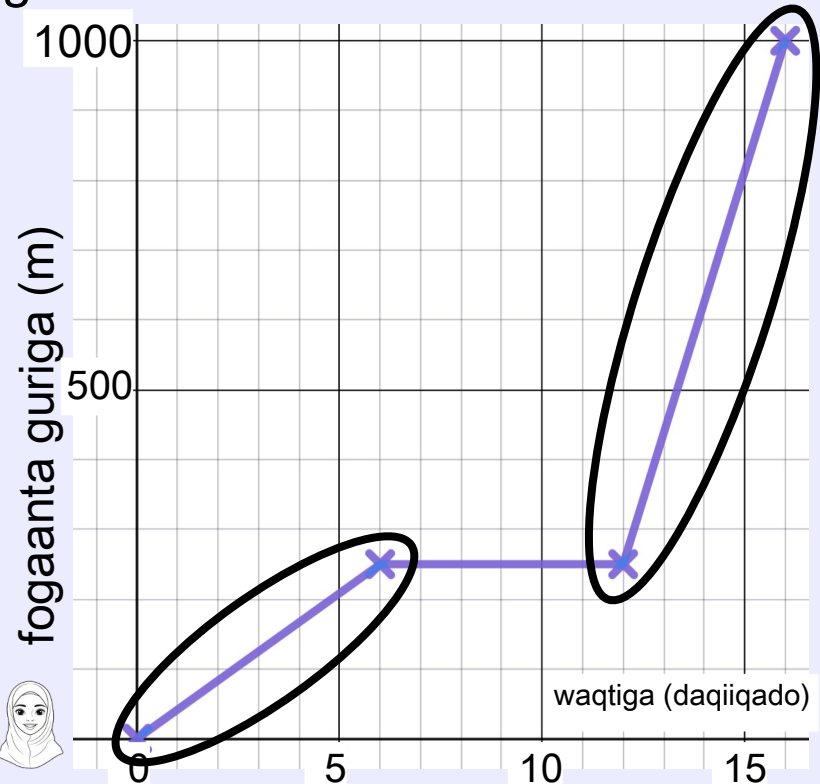
Beddelka jihada

**b**

Wadadu way sii dheerayd

**c**

Beddelka xawaaraha



Maxay noo sheegaysaa isbeddelkan gradient-ka?

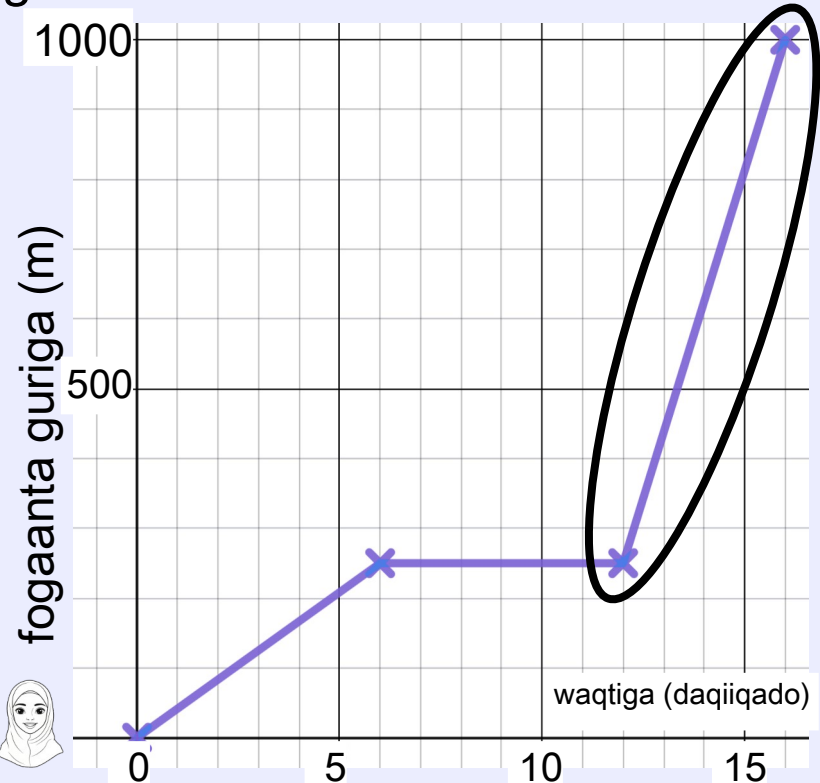
**a**

Gradient-ka sii kordhaya wuxuu muujinayaa heerka isbeddelka fogaanta marka loo eego waqtiga, sidaas darteed xawaare ka weyn.

**b**

**c**

Beddelka xawaaraha



# Akhriska garaafyada fogaanta-waqtiga

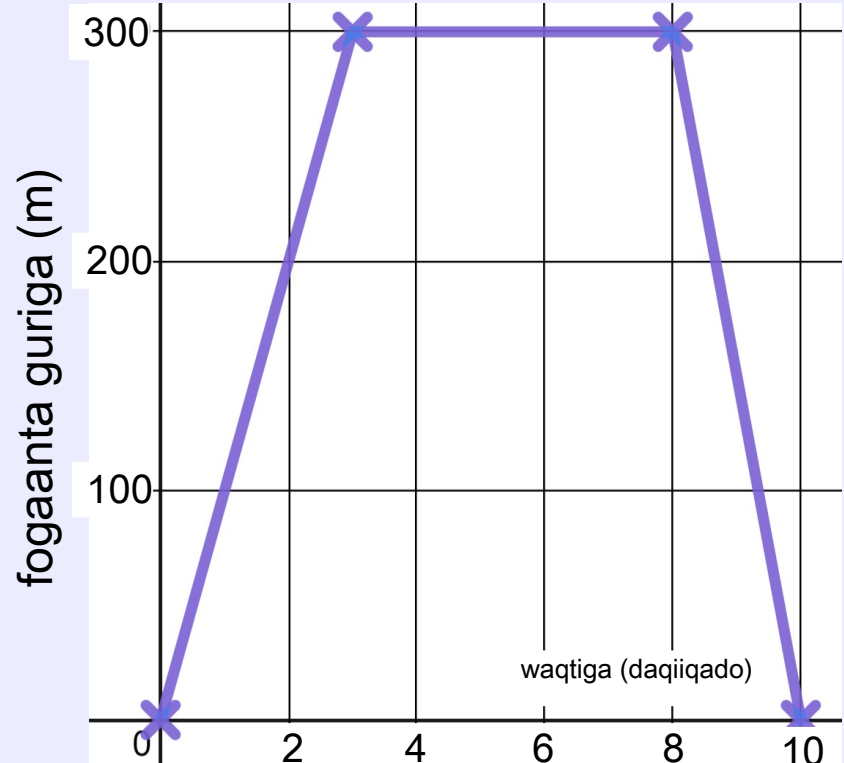
Garaafkani wuxuu ka turjumayaa safarka Izzy ee guriga saaxiib. Immisa ayay Izzy u socotay guud ahaan?

**a** 10 mitir

**b** 300 mitir

**c** 20 mitir

**d** 600 mitir



1) Waa halkan garaaf wakhti-fogaansho oo ku saabsan safar baaskiil oo uu qaaday Yacquub.

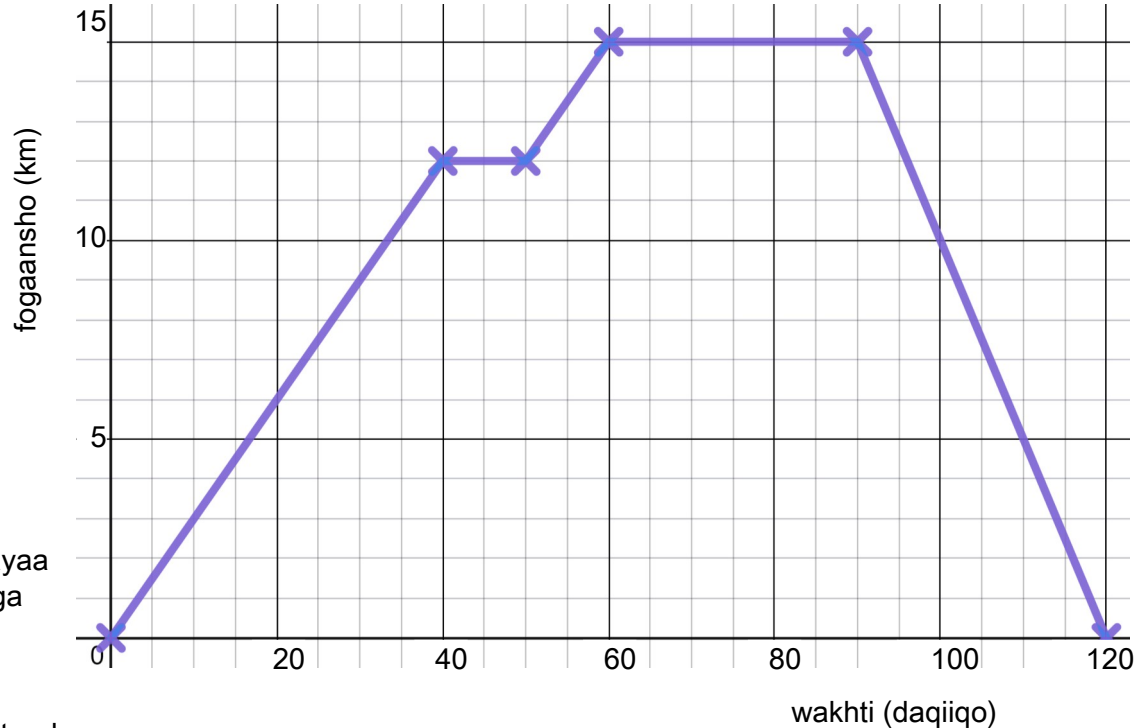
a) Intee ayuu ka fogaa 30 daqiiqo?

b) Maxaa dhacay 40 daqiiqo?

c) Goorma ayuu Yacquub bilaabay inuu ku soo noqdo guriga?

d) Intee buu Yacquub wadarta ku socday baaskiil?

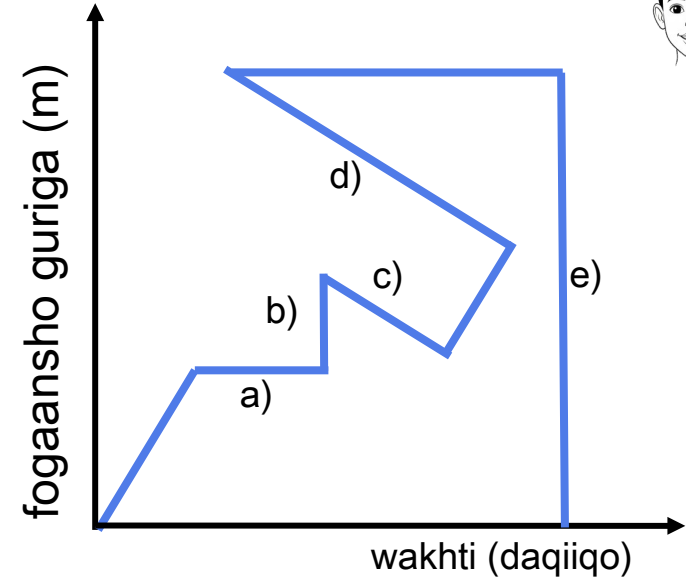
e) Ma barta ugu fog ee Yacquub guriga ka fogaa ayaa ahayd meesha sare, ama meesha hoose, ee joogga (altitude) safarkan?



Qor jumlad si aad u caddayso jawaabtaada.

2) Axmed wuxuu ku tusayaa garaaf wakhti-fogaansho oo uu sawiray ka hor darsigan. Hadda wuxuu ogaaday inay jiraan daqiiqado aan run ahayn.

Daqiiqad kasta oo la calaamadeeyay, sheeg haddii ay tahay mid suurtagal ah ama aan suurtagal ahayn, oo qor jumlad sharraxaysa sababta.



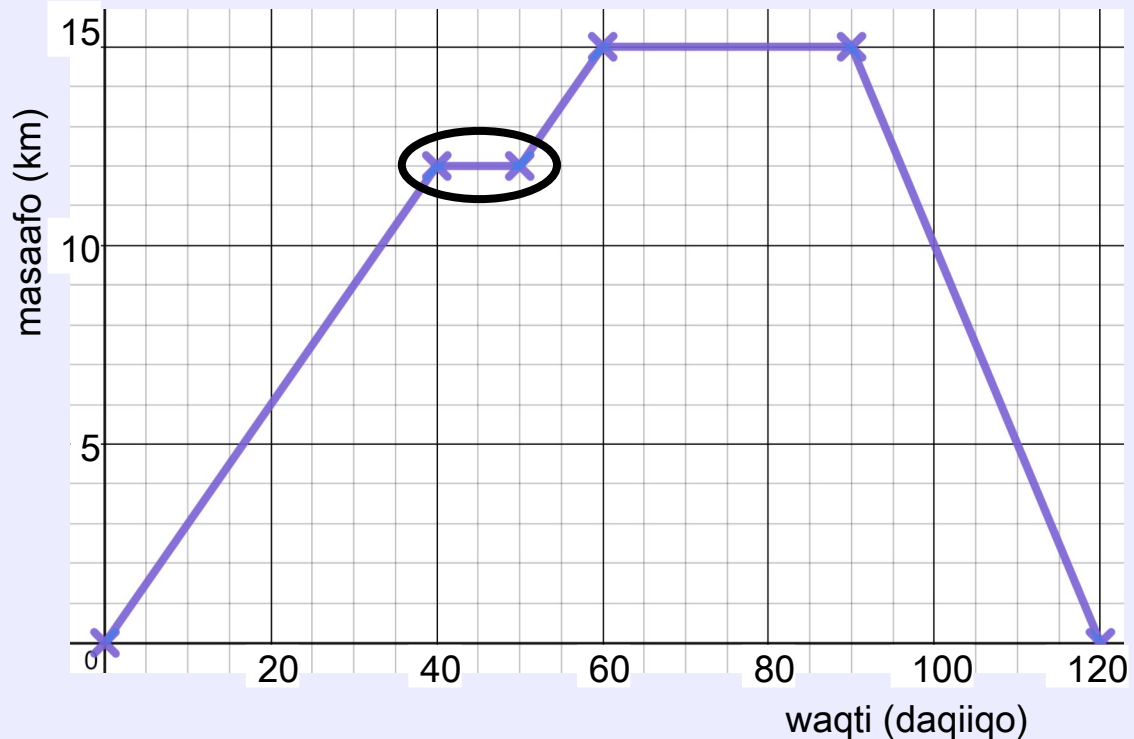
1) Waa halkan garaaf wakhti-fogaansho oo ku saabsan safar baaskiil oo uu qaaday Yacquub.

a) Immisa ayuu ka fogaa 30 daqiiqo?

b) Maxaa dhacay 40 daqiiqo?

c) Waqtee ayuu Yacquub bilaabay inuu ku noqdo guriga?

d) Immisa ayuu Yacquub socday guud ahaan?

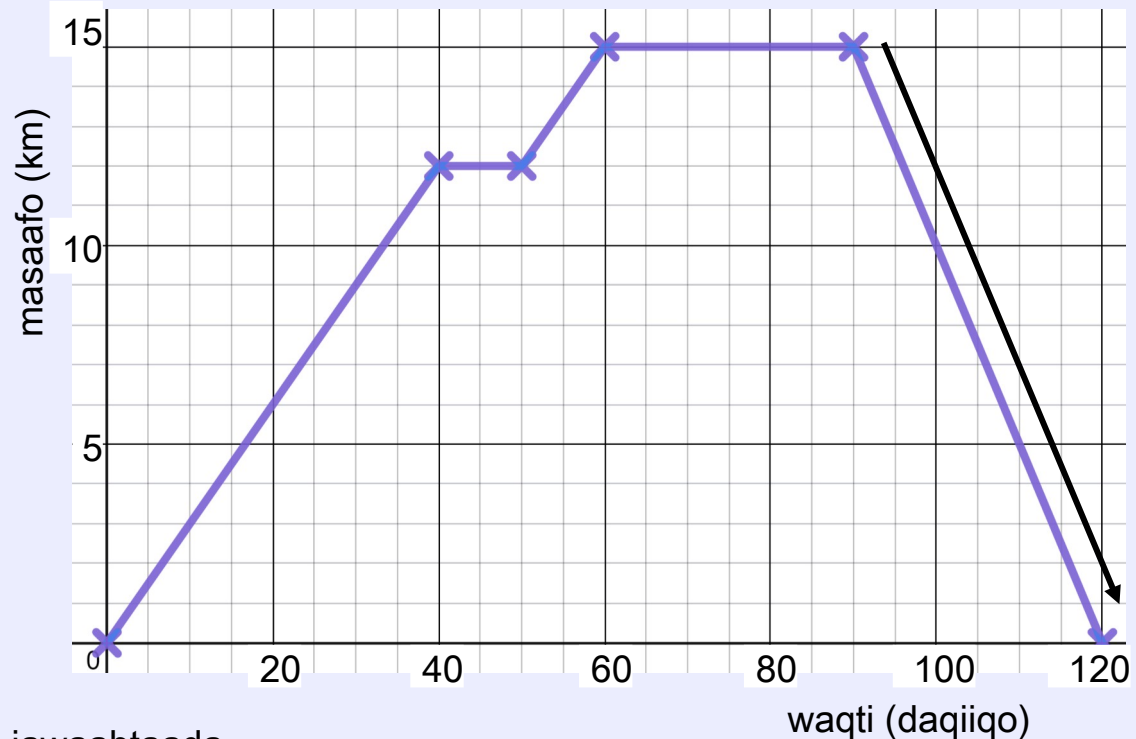


1) Waa kan garaafka waqtiga masaafada ee safarka baaskiil ee Yacquub qaaday.

Barta sare.

Waxaa laga yaabaa inaad qortay: 'Jiirada safarka guriga waa qaybta ugu qallafsan ee garaafka, taas oo noo sheegaysa inay tahay xawaaraha ugu sarreeya.'

e) Barta ugu fog ee Yacquub guriga ma ahayd barta sare, ama barta hoose, ee joogga safarkan?

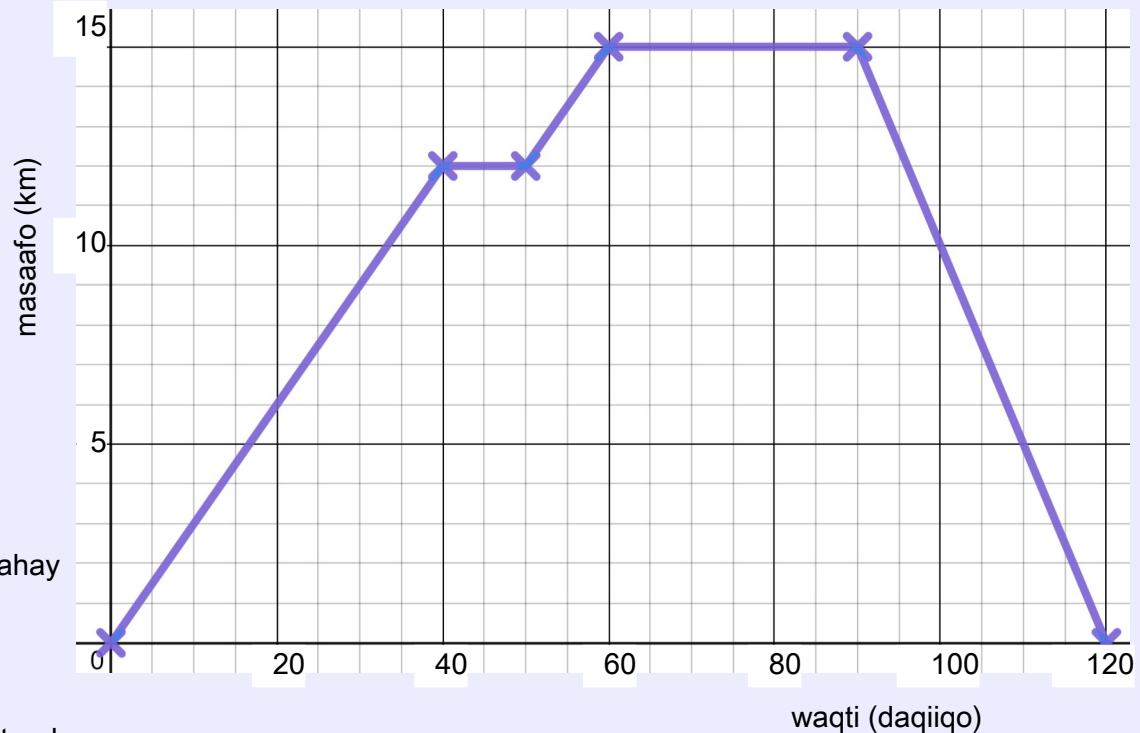


Qor jumlad si aad u caddayso jawaabtaada.

# 1) Waa kan garaafka waqtiga masaafada ee safarka baaskiil ee Yacquub qaaday.

Barta ugu sarreysa.

Waxaa laga yaabaa inaad qortay: “Yacquub wuxuu nasasho ku yeeshay jidka halkaas, laakiin soo laabashada ma uusan yeelin. Tani waxay soo jeedinaysaa in jidka soo laabashadu uu fududaa (tusaale, hoos u dhac)”

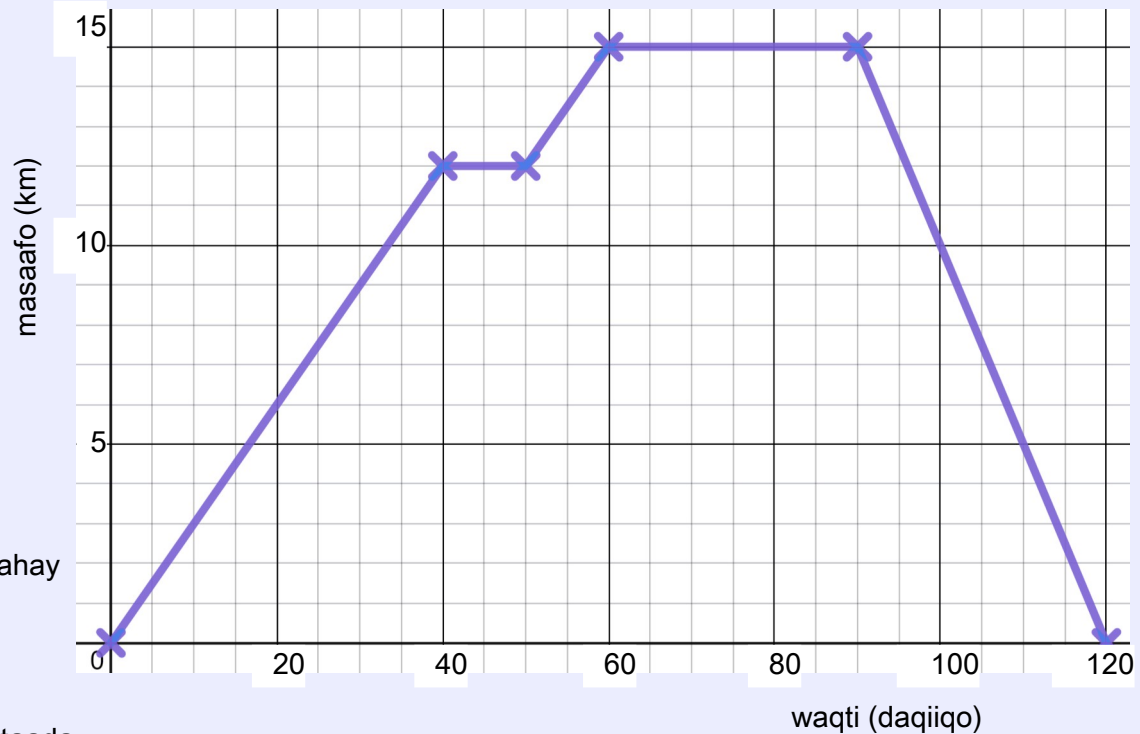


e) Barta ugu fog ee Yacquub guriga ka fogaa ma tahay barta ugu sarreysa, mise barta ugu hooseysa, ee joogga (altitude) baaskiilkan?

Qor jumlad si aad u caddayso jawaabtaada.

1) Halkan waxaa ah garaaf masaafo-waqt oo ah baaskiil uu qaatay Yacquub.

Lama oggolaan inaad qorto:  
“Safarka soo laabashadu wuxuu  
garaafka ku sii socdaa hoos u dhac”



e) Barta ugu fog ee Yacquub guriga ka fogaa ma tahay  
barta ugu sarreysa, mise barta ugu hooseysa, ee  
joogga (altitude) baaskiilkan?

Qor jumlad si aad u caddayso jawaabtaada.

2) Axmed wuxuu ku tusayaa garaaf masaafo-waqtii oo uu sawiray ka hor darsigan. Hadda waa ogyahay inay jiraan waqtiyo aan runi ahayn.

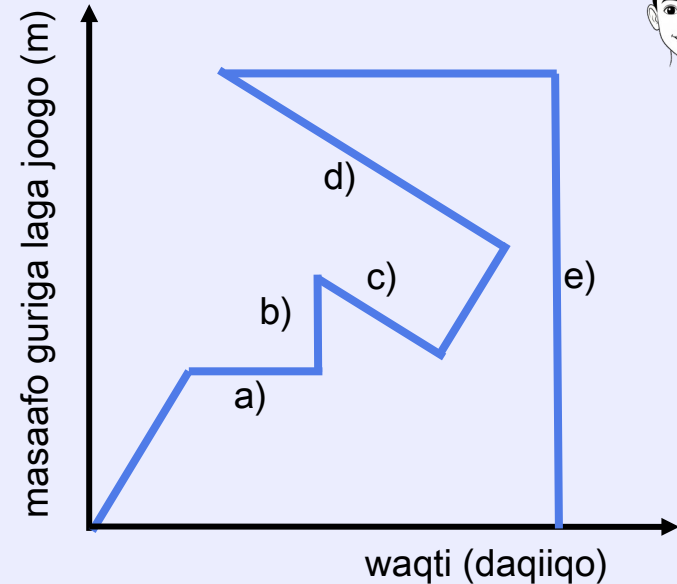
Waqti kasta oo la calaamadeeyay, sheeg in waqtigaas uu suurtagal yahay ama aan suurtagal ahayn, oo qor jumlad sharraxaysa sababta.

Suurtagal - Tani waa joogsi safarka dhexdiisa.

Aan suurtagal ahayn - Tani waxay noqonaysaa isbeddel meel bannaan oo waqti eber ah.

Suurtagal - Tani waa dhaqaaq xagga guriga ah oo leh xawaare joogto ah.

Ma suurtagal - Tani waxay ka dhigan tahay dib u noqoshada waqtiga.



### Qaabaynta iyo garaafyada

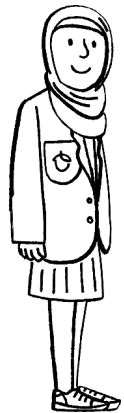


Akhriska garaafyada masaafada-waqtiga

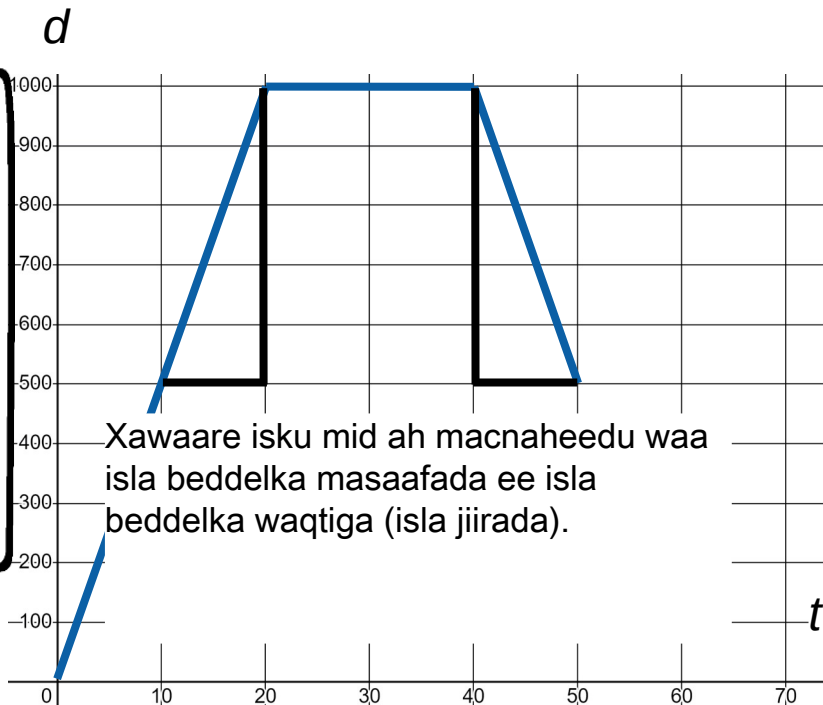


Sawiridda garaafyada masaafada-waqtiga

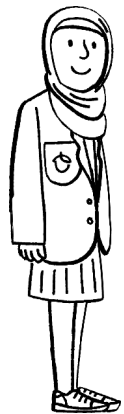
Mararka qaarkood waxaan horey u haynaa macluumaadka, waa inaan sawirnaa garaafka masaafada ( $d$ ) iyo waqtiga ( $t$ ). Iyadoo la adeegsanayo shabakad, waxaan si sax ah u calaamadayn karnaa dhibcaha.



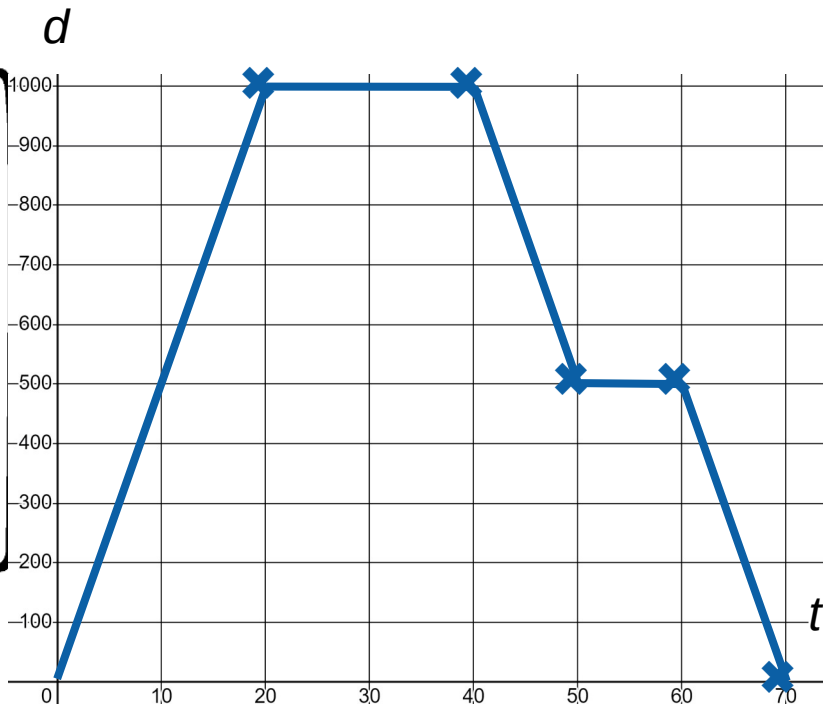
Waxaan u socdaa dukaanka 1 km u jira, waxay qaadataa 20 daqiiqo. Waxaan joogaa dukaanka 20 daqiiqo, ka dibna waxaan ku soo laabtaa guriga isla xawaarahaas. Badhka jidka waxaan istaagaa 10 daqiiqo si aan ugu dhiibo alaabo qaraabo. Ka dib waxaan ku soo laabtaa guriga isla xawaaraha aan horay u socday.



Mararka qaarkood waxaan horey u haynaa macluumaadka, waa inaan sawirnaa garaafka masaafada ( $d$ ) iyo waqtiga ( $t$ ). Iyadoo la adeegsanayo shabakad, waxaan si sax ah u calaamadayn karnaa dhibcaha.



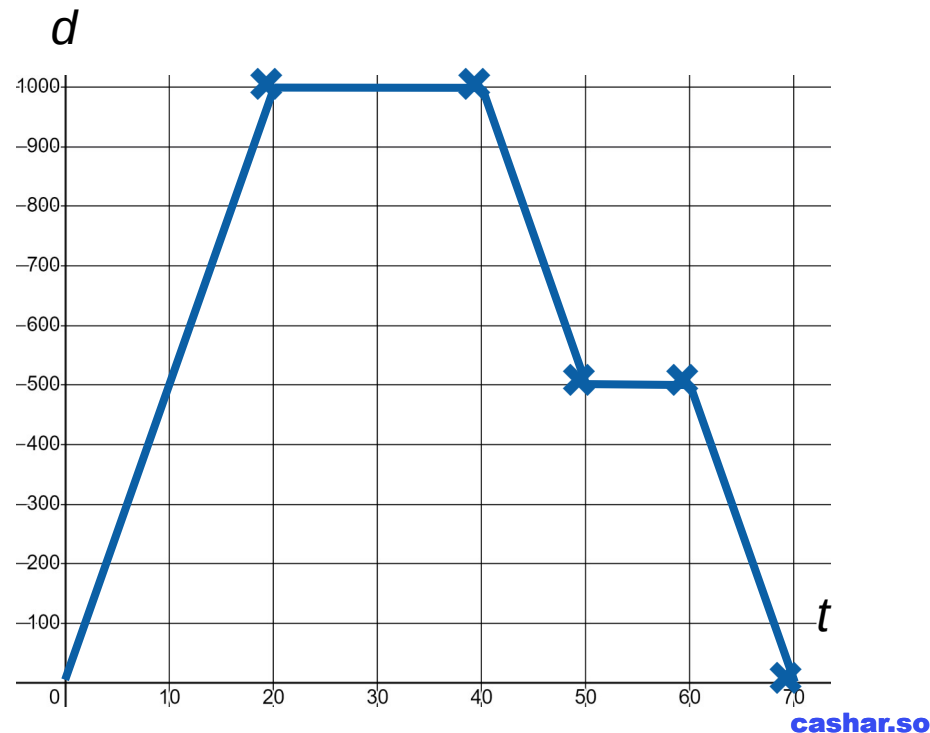
Waxaan u socdaa dukaanka 1 km u jira, waxay qaadataa 20 daqiiqo. Waxaan joogaa dukaanka 20 daqiiqo, ka dibna waxaan ku soo laabtaa guriga isla xawaarahaas. Badhka jidka waxaan istaagaa 10 daqiiqo si aan ugu dhiibo alaabo qaraabo. Ka dib waxaan ku soo laabtaa guriga isla xawaaraha aan horay u socday.



# Sawiridda garaafyada masaafada-waqtiga

Mararka qaarkood waxaan horey u haynaa macluumaadka, waa inaan sawirnaa garaafka masaafada ( $d$ ) iyo waqtiga ( $t$ ). Iyadoo la adeegsanayo shabakad, waxaan si sax ah u calaamadayn karnaa dhibcaha.

Qaabkayagu wuxuu u qaadanayaa in Caasha ay socotay xawaare joogto ah markay dhaqaaqaysay, sidaas darteed xariiqyada toosan. Tani waa caadi ilaa lagu sheego wax kale oo ku saabsan qaabka garaafka masaafada-waqtiga ee fudud.



Waa maxay isku-duwayaasha koowaad ee loo baahan yahay in lagu calaamadeeyo safarkan?

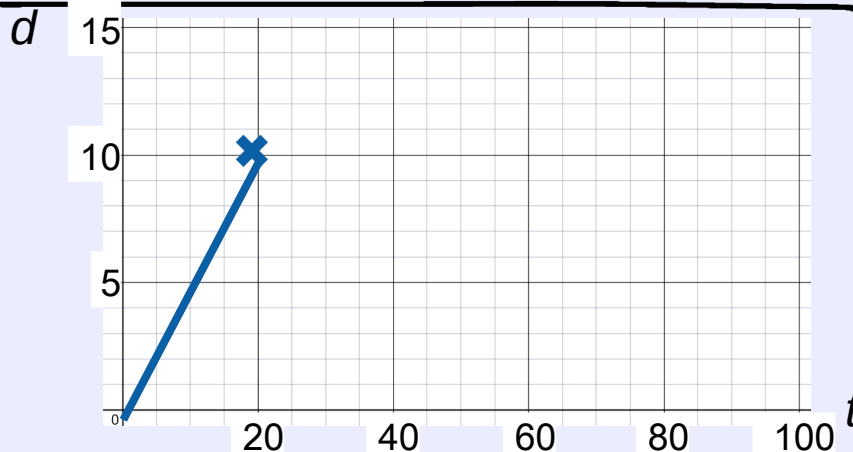
(20 daqiiqo, 10 km)

**a** (20, 10) ✓

**b** (10, 10)

**c** (10, 20)

Waxaan ku bilownaa si degdeg ah oo waxaan ku soconaa 10 km 20 daqiiqo gudahood. Waa inaan istaagnaa oo nasannaa 15 daqiiqo. Waxaan mar kale bilawnaa baaskiilka oo waxaan gaarnaa meeshii aan u soconay, 15 km guriga, 15 daqiiqo ka dib. Waxaan halkaas ku joognaa 25 daqiiqo ka hor intaan ku soo laaban guriga 25 daqiiqo gudahood.



Waa maxay isku-duwayaasha xiga ee loo baahan yahay in lagu calaamadeeyo?

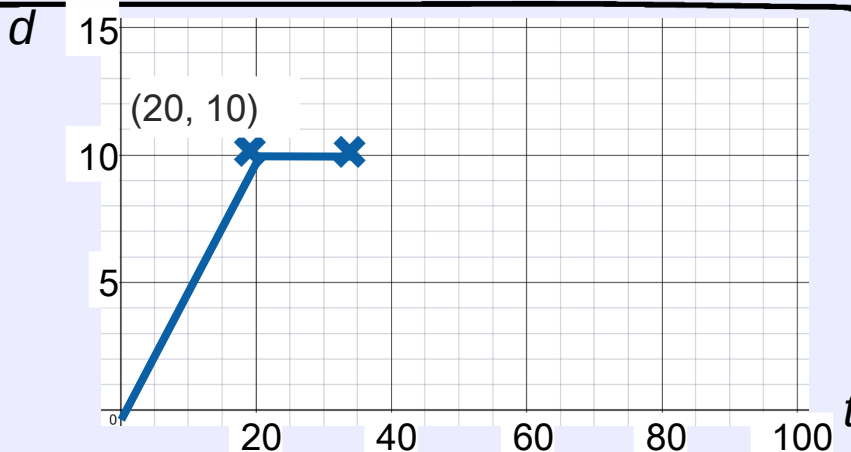
**a** (20, 25)

**b** (35, 10) ✓

Masaafada isma beddelin, 15 daqiiqo oo wakhti dheeri ah.

**c** (35, 25)

Waxaan ku bilownaa degdeg, waxaana ku baabuur (cycle) 10 km 20 daqiiqo gudahood. Waa inaan joogsanaa oo nasanaa 15 daqiiqo. Waxaan dib u bilawnaa baabuurka (cycling) waxaana gaarnaa meeshii, 15 km guriga 15 daqiiqo ka dib. Halkaas waxaan ku joognaa 25 daqiiqo ka hor inta aynaan guriga ku soo noqon 25 daqiiqo gudahood.



## Sawiridda garaafyada wakhtiga masaafada (distance time graphs)



Hubi

Waa maxay isku-duwayaasha (coordinate) xiga ee la sawiri karo?

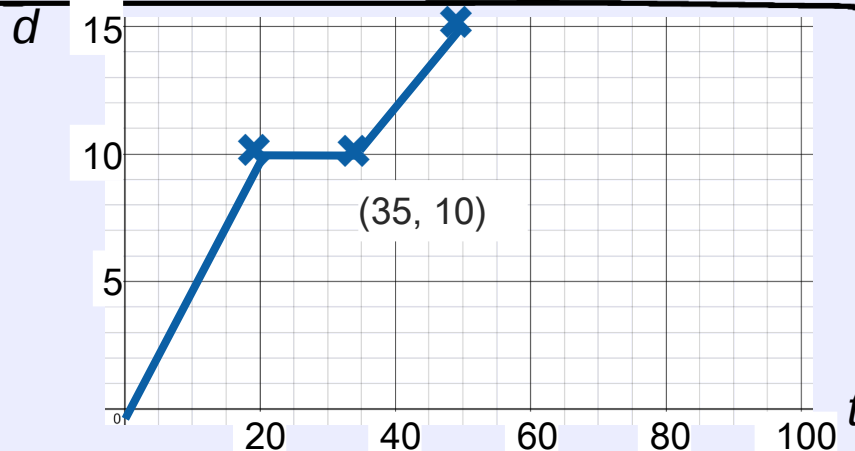
**a** (15, 15)

**b** (50, 25)

**c** (50, 15) ✓

15 daqiiqo oo wakhti dheeri  
ah oo gaaraya 15 km

Waxaan ku bilownaa degdeg, waxaana ku baabuur (cycle) 10 km 20 daqiiqo gudahood. Waa inaan joogsanaa oo nasanaa 15 daqiiqo. Waxaan dib u bilawnaa baabuurka (cycling) waxaana gaarnaa meeshii, 15 km guriga 15 daqiiqo ka dib. Halkaas waxaan ku joognaa 25 daqiiqo ka hor inta aynaan guriga ku soo noqoni 25 daqiiqo gudahood.



## Sawiridda garaafyada wakhtiga masaafada (distance time graphs)



Hubi

Waa maxay isku-duwayaasha (coordinate) xiga ee la sawiri karo?

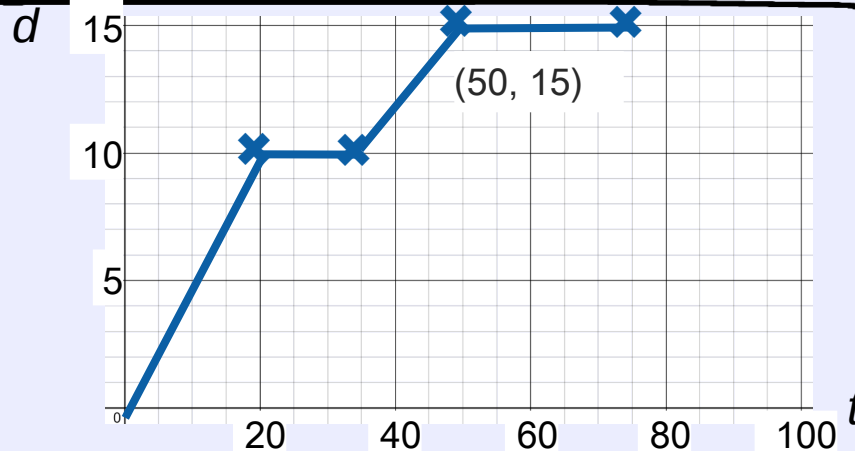
Waxaan ku bilownaa degdeg, waxaana ku baabuur (cycle) 10 km 20 daqiiqo gudahood. Waa inaan joogsanaa oo nasanaa 15 daqiiqo. Waxaan dib u bilawnaa baabuurka (cycling) waxaana gaarnaa meeshii, 15 km guriga 15 daqiiqo ka dib. Halkaas waxaan ku iioqnaa 25 daqiiqo ka hor inta aynaan guriga ku soo noqon 25 daqiiqo gudahood.

**a** (25, 15)

**b** (75, 15) ✓

25 daqiiqo oo wakhti dheeri ah, masaafada isma beddelin.

**c** (50, 40)



## Sawiridda garaafyada wakhtiga masaafada (distance time graphs)

Waa maxay isku-duwayaasha (coordinate) xiga ee la sawiri karo?

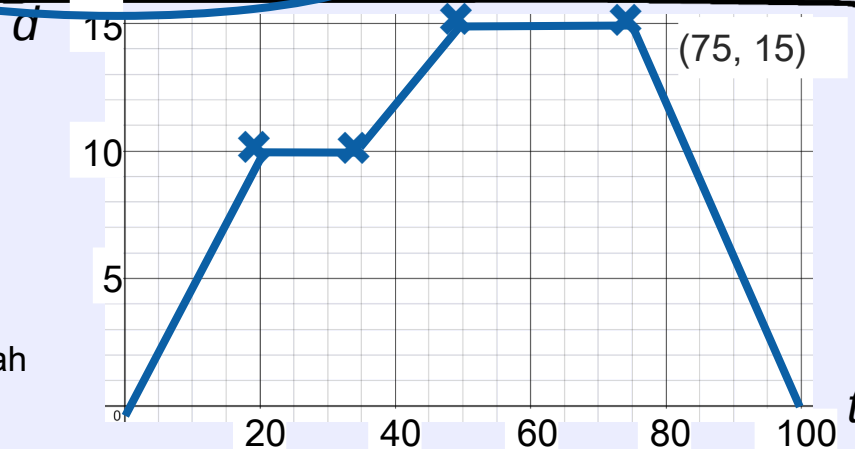
Waxaan ku bilownaa degdeg, waxaana ku baabuur (cycle) 10 km 20 daqiiqo gudahood. Waa inaan joogsanaa oo nasanaa 15 daqiiqo. Waxaan dib u bilawnaa baabuurka (cycling) waxaana gaarnaa meeshii, 15 km guriga 15 daqiiqo ka dib. Halkaas waxaan ku joognaa 25 daqiiqo ka hor inta aynaan guriga ku soo noqon 25 daqiiqo gudahood.

**a** (100, 30)

**b** (75, 40)

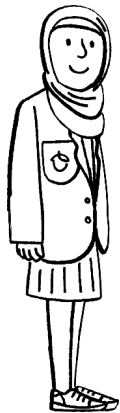
**c** (100, 0) ✓

25 daqiiqo oo wakhti dheeri ah oo gaaraya masaafada 0 km



Waxaa jira waqtiyo badan oo xisaabta (maths) ah oo sawir qaab (sketch of a model) ku filan yahay.

Waxaan u socdaa guriga saaxiibkay oo 400 m u jira. Taasi waxay qaadataa 5 daqiiqo. Waxaan sugaa 5 daqiiqo markaan soo qaadayo. Kadib waxaan wada soconnaa sinemada oo 600 m u jirta, laakiin waan sheekaysanaynaa sidaas darteed waxaan u soconnaa xoogaa gaabis ah, waxay nagu qaadataa 10 daqiiqo.



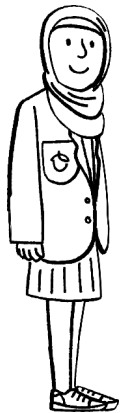
$d$

Waxaa faa'iido leh in la bilaabo isugeynta masaafada iyo wakhtiga.

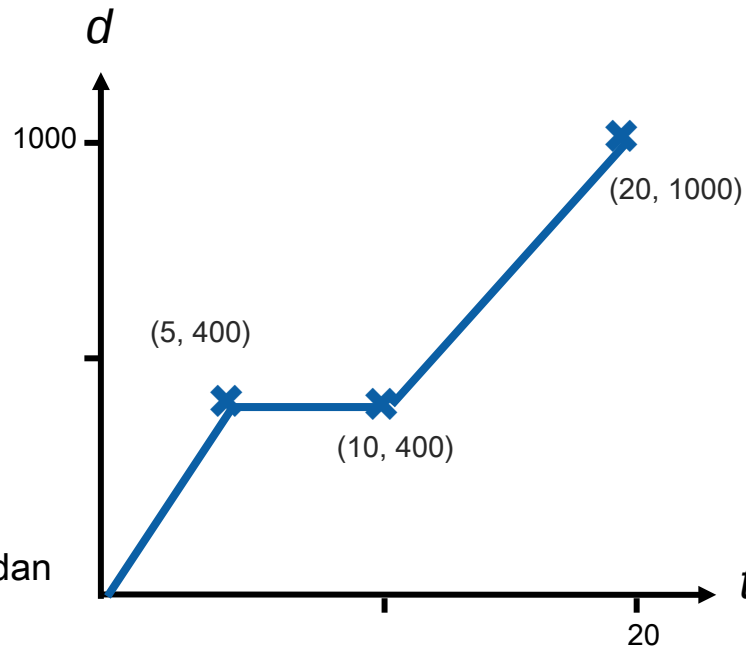
$t$

Waxaa jira waqtiyo badan oo xisaabta (maths) ah oo sawir qaab (sketch of a model) ku filan yahay.

Waxaan u socdaa guriga saaxiibkay oo 400 m u jira. Taasi waxay qaadataa 5 daqiiqo. Waxaan sugaa 5 daqiiqo markaan soo qaadayo. Kadib waxaan wada soconnaa sinemada oo 600 m u iirta. Laakiin waan sheekaynaynaa sidaas darteed waxaan u soconnaa xoogaa gaabis ah, waxay nagu qaadataa 10 daqiiqo.

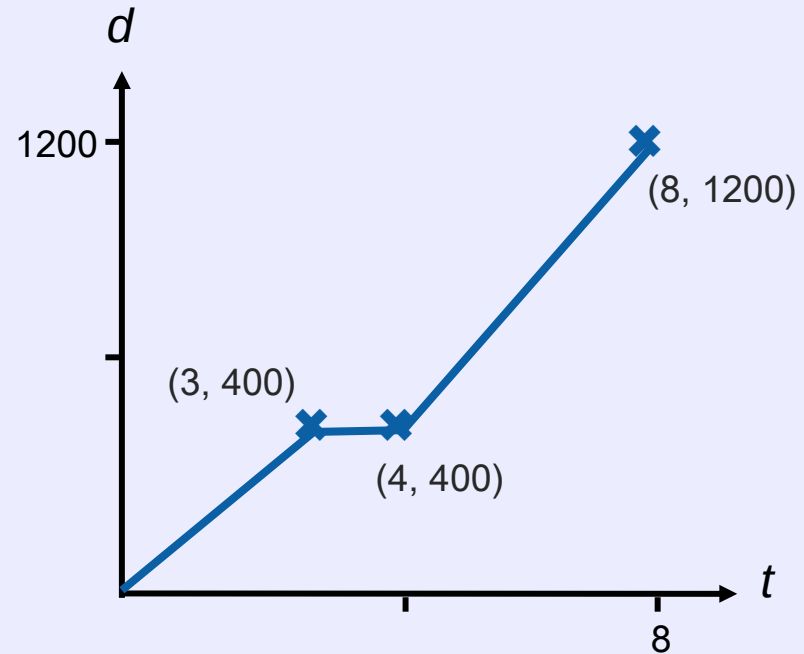


Sawirkeenu waa ku filan yahay inuu muujiyo jiraddan 'gaabisan', oo aan u qallafsanayn.



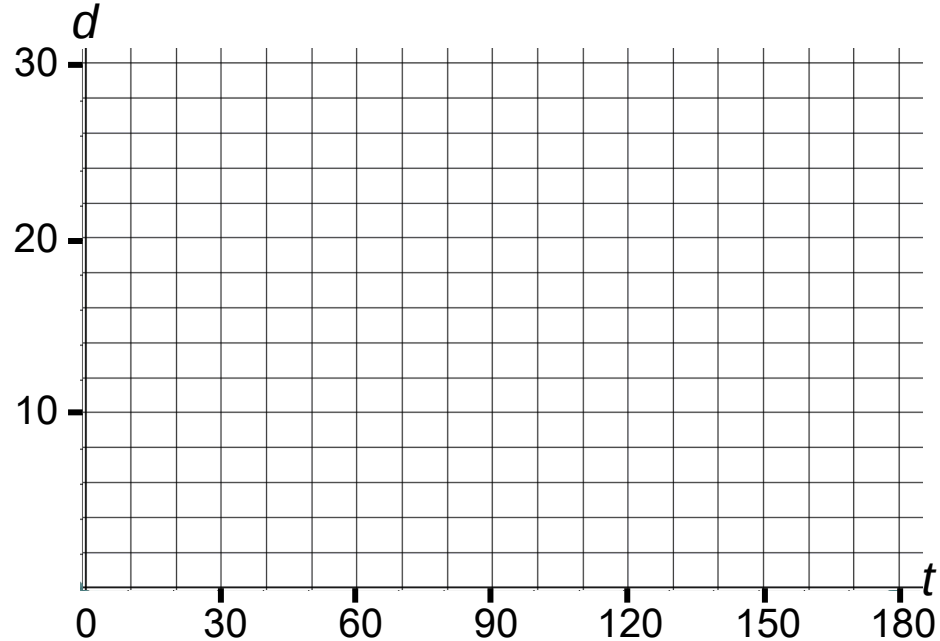
Dhammeystir sawirka garaafka (graph) ee masaafada-waqtiga ee safarka.

Waxaan u socdaa guriga saaxiibkay oo 400 m u jira. Taasi waxay qaadataa 3 daqiiqo. Waxaan sugayaa 1 daqiiqo markaan soo qaadayo. Ka dib waxaan wada orodnaa xarunta cayaaraha oo 800 m ah, taas oo 4 daqiiqo nagu qaadata.



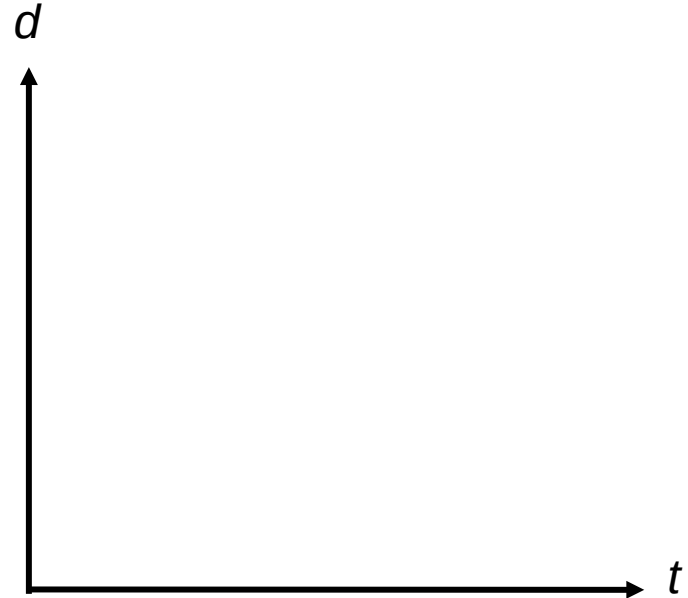
## 1) Isticmaal shabakadda (grid) si aad u sawirto safarka tababarka ee Yacquub.

“Waxaan baaskiil ku soconaa 12 km rubuc saac gudahood. Rubuc saac ee xiga waxaan u soconaa 4 km oo keliya. Waxaan dedejinaynaa oo waxaan u soconaa 14 km 20 daqiiqo, ka dib waxaan u leexanaynaa guriga, iyadoo 14 km kale 20 daqiiqo nagu qaadayo. Waxaan nasanaynaa 20 daqiiqo ka hor intaan saacad ku socon guriga ka dib nasashada.”



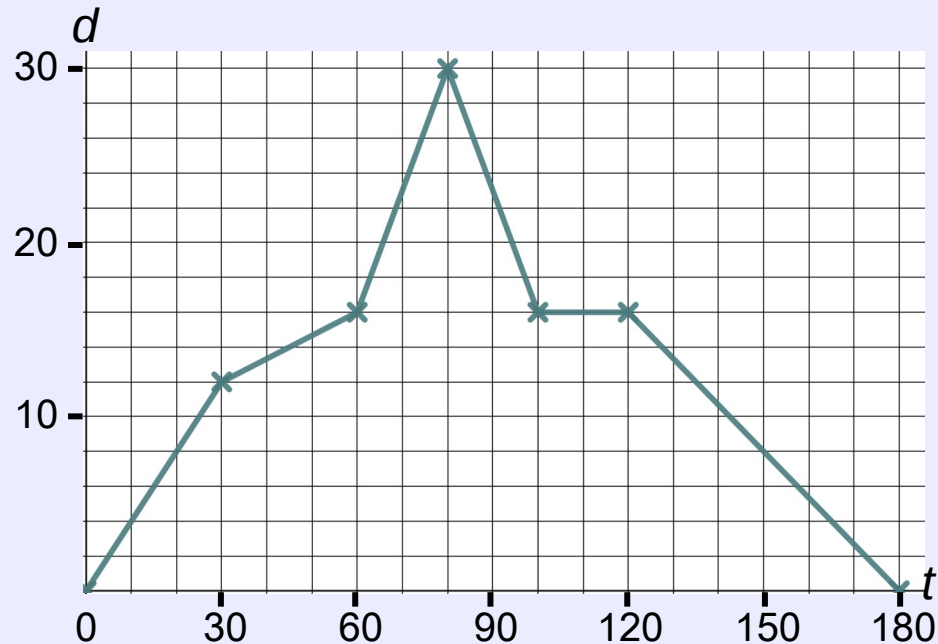
2) Sawir garaafka safarka baabuurka ee Isra ee booqashada qaraabada.

Waxaan baxnay oo waxay nagu qaadataa rubuc saac inaan 40 km dhammaystirno oo aan gaarno wadada weyn. Saacad gudaheed oo wadada weyn ah waxaan safarnaa 100 km. Ka dib waxaan la kulannaa taraafig oo waxaan istaagnaa rubuc saac. Ka dib waxaan u dhaqaaqnaa si tartiib ah, annagoo 20 km ugu dambeeya saacad ku dhammaystirna.



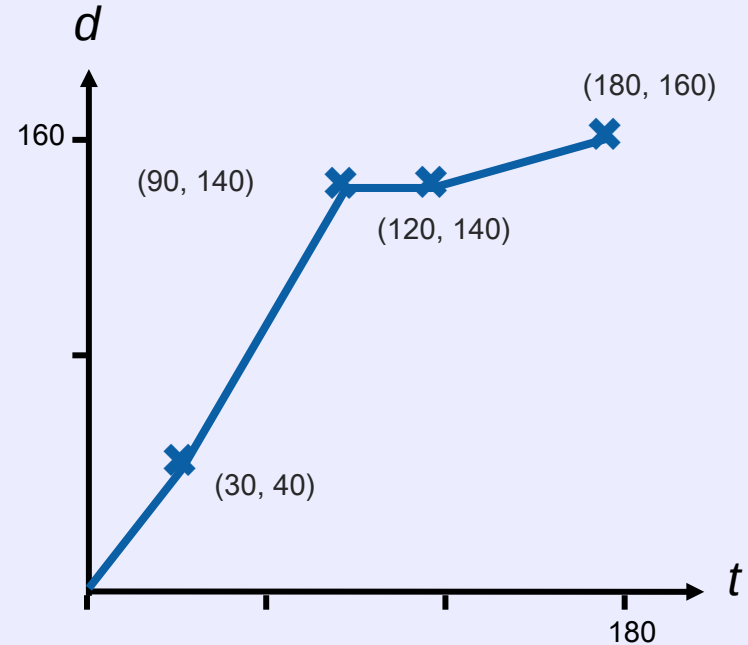
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Waxaan ku qaabayn karnaa xaaladaha nolosha dhabta ah garaaf ahaan, tusaale ahaanna waa garaafka masaafada- $d$  qtiga.

Khadadka toosan ee garaafyada masaafada-waqtiga waxay matalaan xilliyada aan jirin isbeddel masaafada.

Khadadka taagan (vertical) ma suurtoowdo, maxaa yeelay waxay matali doonaan isbeddel masaafada waqti eber ah.

