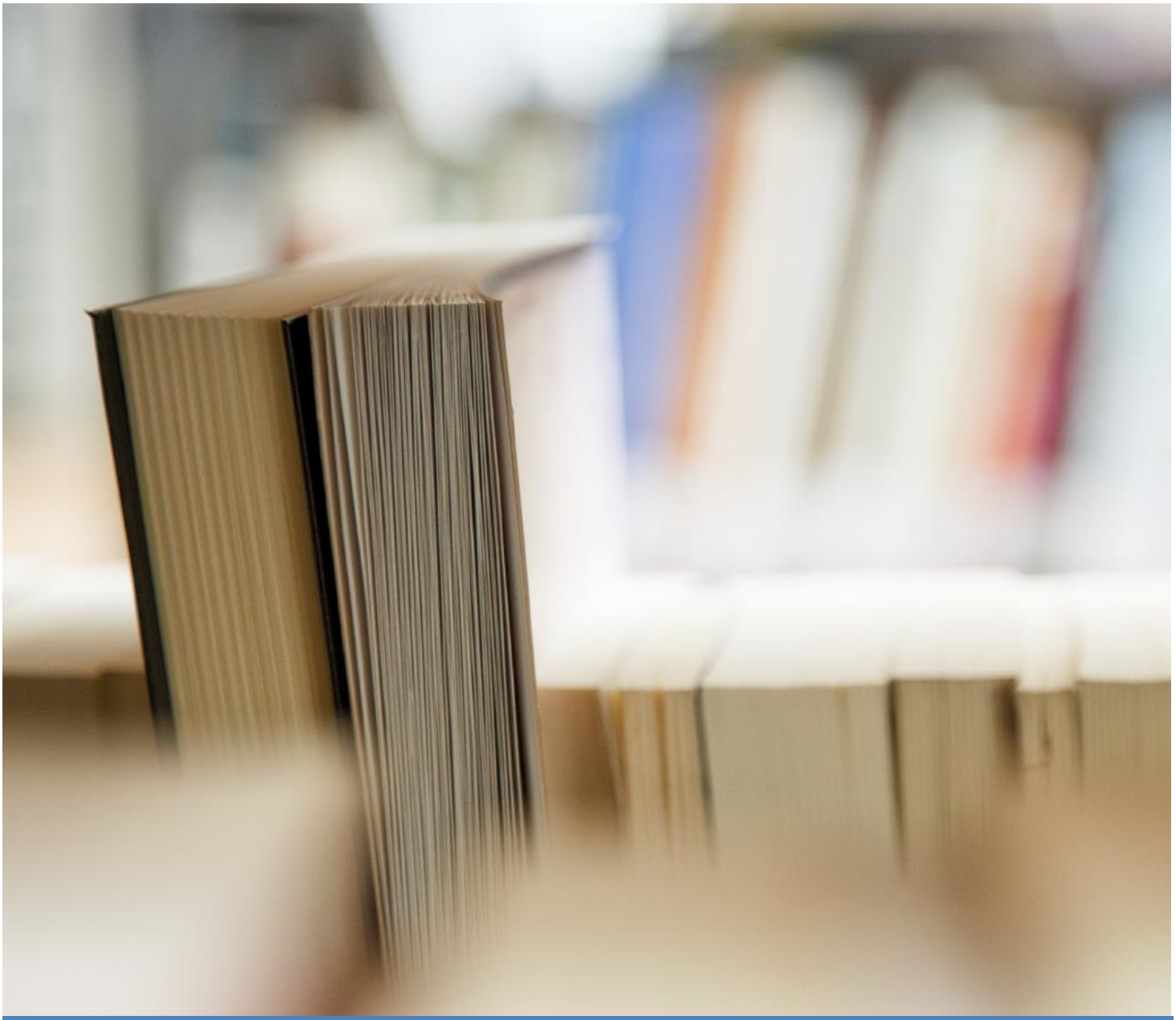


Speed & Acceleration

MATHEMATICS PT3

Speed & Acceleration

Similarities units. Often we see all this units in this chapter.

Speed /Velocity: $m/s = ms^{-1}$

Speed / Velocity: $km/h = kmh^{-1}$

Acceleration: $m/s^2 = ms^{-2}$

Students must learn about conversion

Question	Solution
Convert from $5kmh^{-1}$ to mh^{-1} Tukar dari $5kmh^{-1}$ ke mh^{-1}	
Convert from $10mh^{-1}$ to mh^{-1} Tukar dari $10kmh^{-1}$ ke mh^{-1}	
Convert from $15kmh^{-1}$ to kms^{-1} Tukar dari $15kmh^{-1}$ ke kms^{-1}	
Convert from $10kmh^{-1}$ to mh^{-1} Tukar dari $10kmh^{-1}$ ke mh^{-1}	
Convert from $8mh^{-1}$ to kms^{-1} Tukar dari $8kmh^{-1}$ ke kms^{-1}	
Convert from $8mh^{-1}$ to kmh^{-1} Tukar dari $8kmh^{-1}$ ke kmh^{-1}	

Speed

$$Speed = \frac{distance}{time}$$

Question 1	Solution
Jenny travels from home to school. The distance between her house to the school is 1200m. Given the time of travelling is 200s. Find the speed travelling from home to school\ Jenny berulang-alik dari rumah ke sekolah setiap hari. Jarak di antara rumah ke sekolah ialah 1200m. Memandangkan masa perjalanannya ialah 200s. Cari laju perjalanan dari rumah ke sekolah	

Question 2	Solution
The distance from Mall to the Post Office is 20km. Jeremy used 4 hours to travel from mall to the Post Office by car. Find the speed of the car? Jarak dari Mall ke Pejabat Pos adalah 20km. Jeremy menggunakan masa selama 4 jam untuk melakukan perjalanan dari pusat membeli-belah ke Pejabat Pos dengan kereta. Cari kelajuan kereta?	

Question 3	Solution
Delta airlines used 5 hours to travel from UK to the United States of America. The distance between the two countries is 6500 km. find the speed of the moving airplane? Syarikat penerbangan Delta menggunakan masa 5 jam untuk melakukan perjalanan dari UK ke Amerika Syarikat. Jarak antara kedua-dua negara ialah 6500 km. cari kelajuan kapal terbang yang bergerak?	

Question 4	Solution
In the 1200m sprint race, Joshua needs 20 seconds to complete the race. What is his running speed? Di dalam acara perlumbaan 1200m, Joshua memerlukan 20 saat untuk menghabiskan perlumbaannya. Berapakah kelajuannya?	

Acceleration (Rate Change of Speed)

$$Acceleration = \frac{Change\ in\ velocity}{time}$$
$$= \frac{Final\ Velocity - Initial\ Velocity}{time}$$

Question 1	Solution
A car moves from $\mathbf{55}\boldsymbol{ms}^{-1}$ to $\mathbf{85}\boldsymbol{ms}^{-1}$ in 5s, Find its acceleration Sebuah kereta bergerak dari $\mathbf{55}\boldsymbol{ms}^{-1}$ hingga $\mathbf{85}\boldsymbol{ms}^{-1}$ dalam 5s, Cari pecutan	

Question 2	Solution
Novak speeds from $\mathbf{15}\boldsymbol{ms}^{-1}$ to $\mathbf{75}\boldsymbol{ms}^{-1}$ in 10 seconds. Find his acceleration Kelajuan Novak dari $\mathbf{15}\boldsymbol{ms}^{-1}$ hingga $\mathbf{75}\boldsymbol{ms}^{-1}$ dalam 10 saat. Cari pecutannya	

Question 3	Solution
Novak speeds from $\mathbf{15}\boldsymbol{ms}^{-1}$ to $\boldsymbol{x}\ \boldsymbol{ms}^{-1}$ in 5 seconds. The acceleration of the car is $\mathbf{5}\boldsymbol{ms}^{-2}$. Find the value of x Kelajuan Novak dari $\mathbf{15}\boldsymbol{ms}^{-1}$ hingga $\boldsymbol{x}\ \boldsymbol{ms}^{-1}$ dalam 5 saat. Pecutan kereta ialah is $\mathbf{5}\boldsymbol{ms}^{-2}$.. Cari nilai x	

Question 4	Solution
Roller Coaster speeds from $\boldsymbol{y}\ \boldsymbol{ms}^{-1}$ to $\mathbf{20}\boldsymbol{ms}^{-1}$ in 10 seconds. The acceleration of the roller coaster is $\mathbf{10}\boldsymbol{ms}^{-2}$. Find the value of y Roller Coaster bergerak dengan kelajuaan $\boldsymbol{y}\ \boldsymbol{ms}^{-1}$ ke $\mathbf{20}\boldsymbol{ms}^{-1}$dalam 10 saat. Pecutan roller coaster adalah $\mathbf{10}\boldsymbol{ms}^{-2}$. Cari nilai y	

Question 2

1. Jonathan drove at the speed of 80km/h from hotel to the fire department. Find the distance from hotel to the fire department?
2. After visiting his friend at the fire department, he then visited the police station which is 6km away. Find his average speed? Answer in km/h
3. If Jonathan initial speed after leaving the fire department is 25km/h and his final velocity before reaching the police station is 125km/h, find the acceleration of his moving vehicle

1. Jonathan memandu dengan kelajuan 80km / j dari hotel ke balai bomba. Cari jarak dari hotel ke balai bomba?
2. Setelah menziarahi rakannya di balai bomba, dia kemudian mengunjungi balai polis yang berjarak 6km. Cari kelajuan purata perjalanannya? Jawapan dalam km / j
3. Sekiranya laju awal Jonathan ialah 25km / jam keluar dari balai bomba dan halaju akhir yang sampai di balai polis ialah 125km / jam, cari pecutan kenderaannya?

Question 3

Amy's house was on fire. The fire truck rushed to her house as soon as possible. If the initial speed of the firetruck is 50m/s and the final speed before reaching the house is 65m/s, find the acceleration of the firetruck given the journey to her house is 15 minutes.

Rumah Amy sedang terbakar. Bomba bergegas ke rumahnya dengan pantas. Sekiranya kelajuan awal lori bomba ialah 50m / s dan laju akhirnya ialah 65m / s, cari pecutan lori bomba tersebut jika perjalananya mengambil 15 minute ke destinasi

Question 3

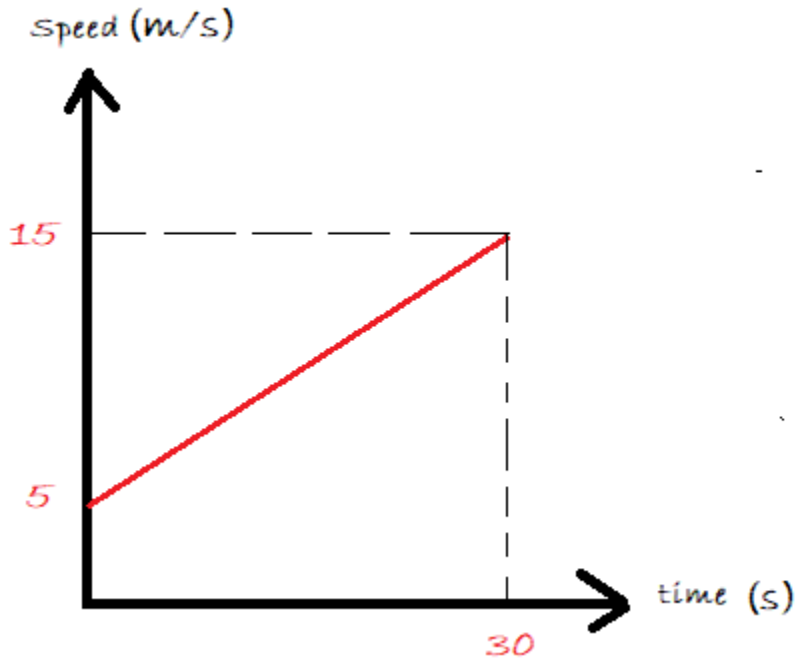
Airplane took off from the runaway from 2m/s to 80m/s in 15 seconds. Find the acceleration of the airplane?

Pesawat terbang berlepas dari lapangan terbang dengan kelajuan 2m / sehingga 80m / s dalam 15 saat. Cari pecutan kapal terbang?

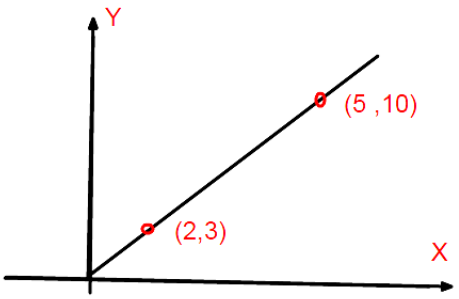
Question 4

1. Father drove his car on the Penang Bridge. His initial speed is $5ms^{-1}$ and his final speed is $15ms^{-1}$. Find the acceleration of his car on the bridge?
2. If Father would like to maintain his acceleration for another 10 seconds, what will be his final velocity

1. Ayah memandu keretanya di Jambatan Pulau Pinang. Dengan kelajuan awalnya $5ms^{-1}$dan kelajuan akhirnya ialah $15ms^{-1}$.. Cari pecutan keretanya di jambatan?
2. Sekiranya ayah ingin mengekalkan pecutannya selama 10 saat lagi, apakah kelajuannya selepas 10 saat



HOW TO CALCULATE GRADIENT



Find the gradient

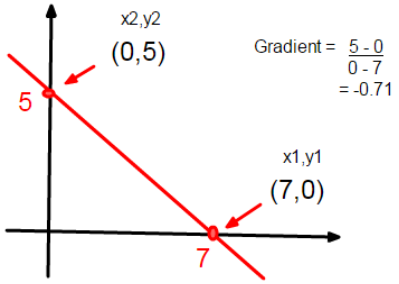
EQUATIONEDITOR2

$$Gradient = \frac{Y_2 - Y_1}{X_2 - X_1}$$

Solution = $\frac{10 - 3}{5 - 2}$

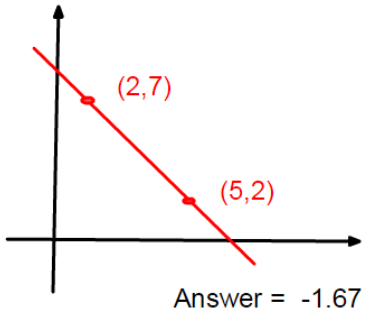
$= \frac{7}{3}$

$= 2.33$

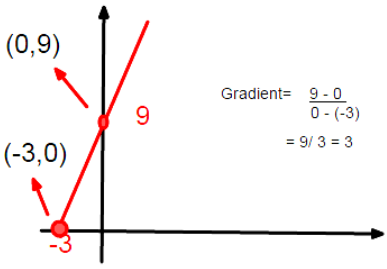


Gradient = $\frac{5 - 0}{0 - 7}$

$= -0.71$

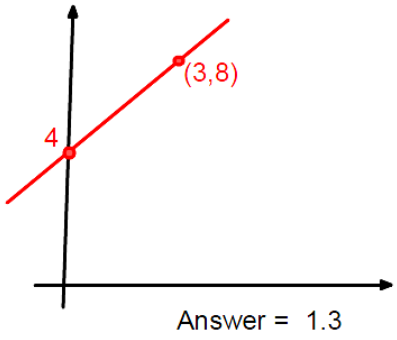


Answer = -1.67



Gradient= $\frac{9 - 0}{0 - (-3)}$

$= 9/3 = 3$

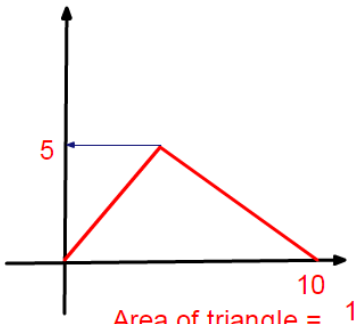


Answer = 1.3

The idea of learning how to calculate gradient is important. You will use it to find speed, velocity and acceleration. For more practice about gradient. Please purchase our Gradient Worksheets.

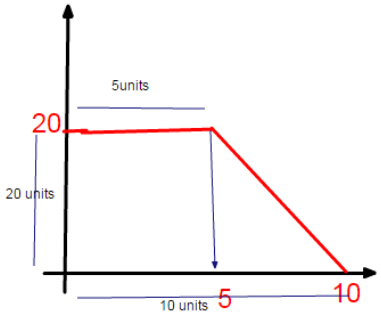
HOW TO CALCULATE AREA

Find the area

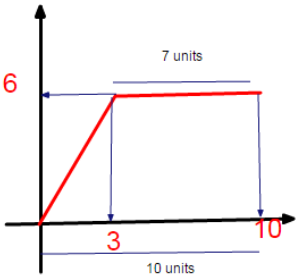


Area of triangle = $\frac{1}{2}$ x 10 x 5

= 25

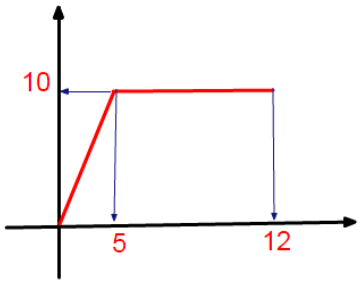


Answer = $\frac{1}{2}$ x (5 + 10) x 20 = 150



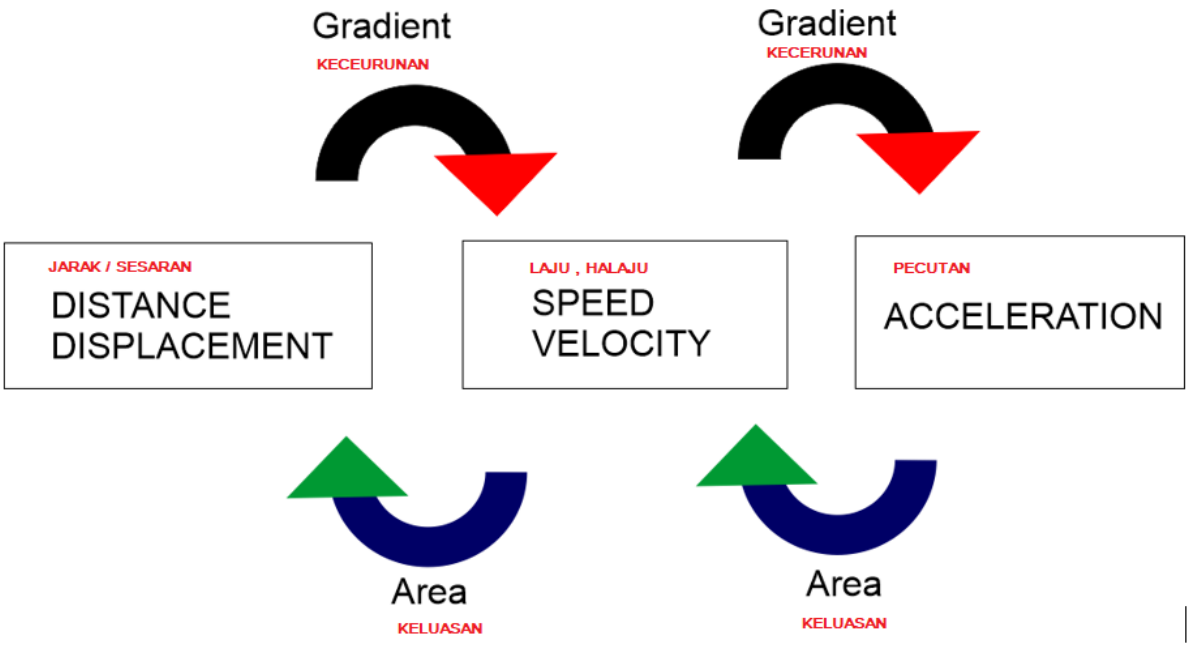
Answer= 39

Answer = $\frac{1}{2}$ x (10 + 7) x 6 = 51



Answer = 95

The idea of learning how to calculate area is important. You will use it to find distance/ displacement, speed/ velocity

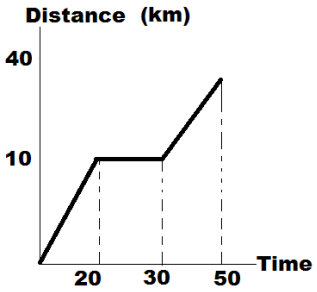


Example:

Given the distance time graph of a car, calculate. Berpandukan graf dibawah, cari

a) Speed for the first 20 minutes
b) Average speed in 50 seconds

a) Kelajuan bagi 20 minit pertama
b) Laju purata dalam masa 50 saat

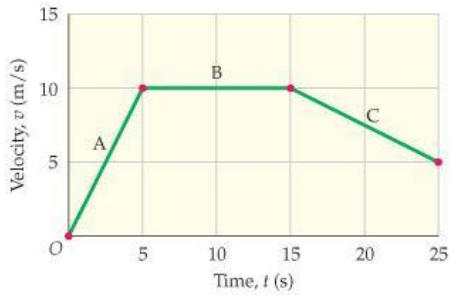


Solution:

a) Speed for the first 20 minutes is $\frac{y_2-y_1}{x_2-x_1} = \frac{10-0}{20-0} = 0.5km\ min^{-1}$
b) Average Speed $\frac{Total\ Distance}{Time} = \frac{40+10}{50} = 1km\ min^{-1}$

Question Graph

Question 1



Given the graph above

1. Find the acceleration of the graph for the first 5 seconds
2. Find the deceleration of the for the last 5 seconds
3. Find the distance travel for the first 15 seconds

Diberi graf di atas

1. Cari pecutan graf bagi 5 saat pertama
2. Cari nyahpecutan bagi 5 saat terakhir
3. Cari jarak perjalanan bagi 15 saat pertama

1 Diagram 1 shows the speed-time graph of a particle for a period of 15 s.

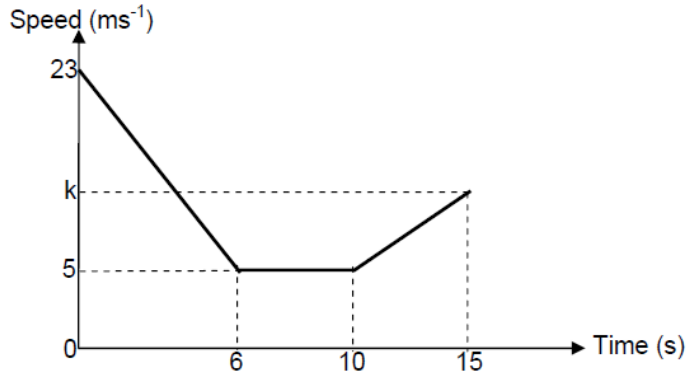


DIAGRAM 1

(a) State the distance, in m, the particle moves with constant speed.
(b) Calculate the rate of change of speed, in ms^{-2}, in the first 6 s.
(c) Calculate the value of k, if the total distance travelled in the first 15 s is 139m.

[6 *marks*]

a) Cari jarak yang dilalui apaibila zarah bergerak dengan laju seragam
b) Cari kadar perubahan laju bagi 6 saat pertama
c) Cari nilai K, jika jumlah jarak yang dilalui ialah 139m bagi tempoh 15s

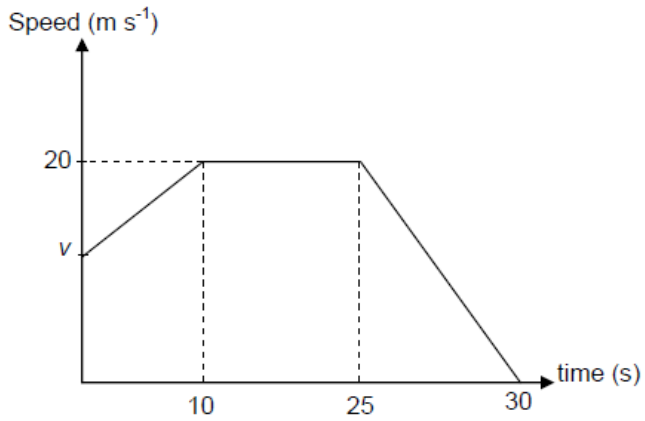


DIAGRAM 4

2

Diagram 4 shows the speed-time graph of a motorcyclist in a period of 30 seconds.
Given that the total distance travelled by the motorcyclist is 525 m.

Calculate,

(a) the rate of change of speed in the last 5 second,

(b) the duration of uniform speed,

(c) the value of *v*.

Gambar rajah diatas menunjukkan graf laju masa bagi tempoh 30 saat. Jumlah jarak yang dilalui ialah 525 m.

Hitung

a) Cari kadar perubahan laju bagi 5 saat yang terakhir
b) Cari masa untuk laju seragam
c) Cari nilai V

3. Diagram 5 shows a velocity-time graph for a particle.

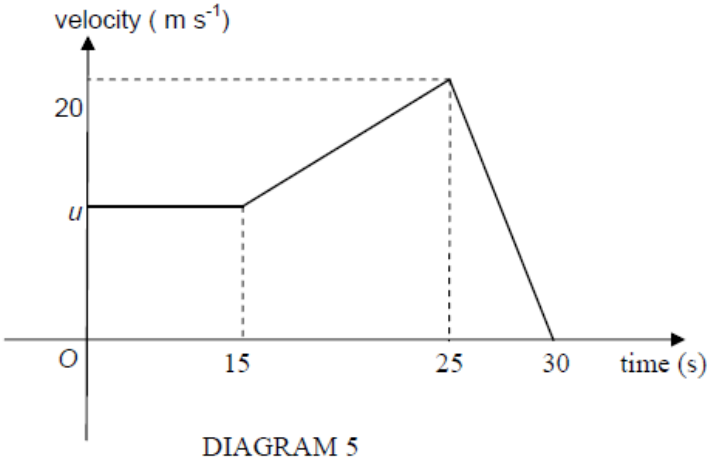


DIAGRAM 5

(a) State the time, in s, the particle moves with constant velocity.

(b) Calculate the accleration, in m s^{-2}, of the particle in the last 5 seconds.

(c) Find the value of *u* if the total distance travelled after 15 seconds is 190 m.

[6 *marks*]

a) Cari masa apabila zarah bergerak dengan halaju seragam
b) Hitung pecutan bagi zarah yang bergerak 5 saat terakhir
c) Cari nilai *u* jika jumlah jarak yang dilalui selapas 15 saat ialah 190cm

4 Diagram 6 shows a displacement – time graph for the journey of a car from town *A* to town *C* passing town *B* and then back to town *A*.

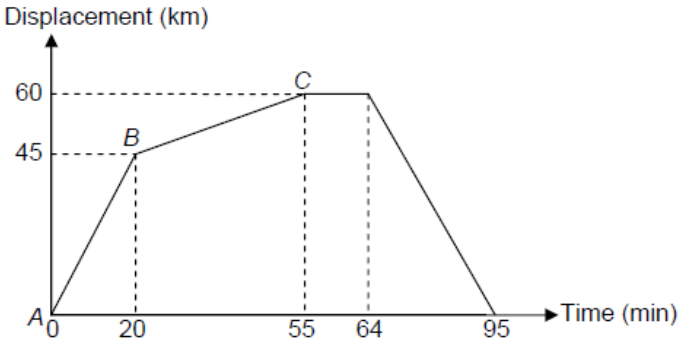


DIAGRAM 6

(a) Calculate the speed in km/h for the journey from town *A* to town *B*.

(b) State the time taken for the car to stop at town *C*.

(c) Calculate the average speed in km/h for the total distance of the car.

[6 marks]

Graf di atas menunjukkan graf sesaran masa

a) Cari laju dalam km/j perjalanan dari Bandar A ke Bandar B
b) Cari masa yang diambil untuk berhenti di Bandar C
c) Cari laju purata dalam km/j untuk perjalananya dalam masa 95 minit.