

JAWAPAN

BAB
9

Laju dan Pecutan Speed and Acceleration

1. Peserta Contestant	Jarak (m) Distance (m)	Masa (min) Time (min)	Jarak/ Distance Masa/ Time	Kedudukan Position
Boon Sie	800	2.5	$\frac{800}{2.5} = 320 \text{ m/min}$	Ketiga Third
Fitri	800	2.3	$\frac{800}{2.3} = 347.8 \text{ m/min}$	Kedua Second
Ramesh	800	2.25	$\frac{800}{2.25} = 355.6 \text{ m/min}$	Pertama First

(a) terpendek; tertinggi
shortest; highest

(b) terpanjang, terendah
longest, lowest

2. (a) Laju / Speed = $\frac{12 \text{ km}}{40 \text{ mm}}$
= 0.3 km/min

(b) Laju / Speed = $\frac{1 \text{ cm}}{0.5 \text{ s}}$
= 2 cm/s

(c) Laju / Speed = $\frac{25 \text{ km}}{20 \text{ min}}$
= 1.25 km/min

3. (a) Jarak/ Distance
= 60 km/j $\times 1.5 \text{ j}$ (60 km/h $\times 1.5 \text{ h}$)
= 90 km

(b) Jarak/ Distance
= 7.5 km/j $\times \frac{45}{60} \text{ j}$ (7.2 km/h $\times \frac{45}{60} \text{ h}$)
= 5.4 km

Tukar minit kepada jam.
Convert minute to hour.

(c) Masa/ Time
= $\frac{1 \text{ cm}}{2 \text{ cm/s}}$
= 0.5 s

(d) Masa/ Time
= $\frac{15 \text{ km}}{0.5 \text{ km/min}}$
= 30 min

4. (a) (i) berbeza; sama
unequal; equal

(ii) tak seragam
non-uniform

(b) (i) sama; sama
equal; equal

(ii) seragam
uniform

5. (a) Kelajuan pada 1.5 jam pertama
Speed for the first 1.5 hours

$$= \frac{225 \text{ km}}{1.5 \text{ j (h)}}$$

$$= 150 \text{ km/j (km/h)}$$

Kelajuan pada 0.5 jam seterusnya
Speed for the next 0.5 hour

$$= \frac{75 \text{ km}}{0.5 \text{ j (h)}}$$

$$= 150 \text{ km/j (km/h)}$$

Maka, kelajuan bot laju itu adalah seragam.
Thus, the speed of the boat is uniform.

(b) Kelajuan pada 30 saat pertama
Speed for the first 30 seconds

$$= \frac{2.5 \text{ m}}{30 \text{ s}}$$

$$= 0.083 \text{ m/s}$$

Kelajuan pada 45 saat seterusnya
Speed for the next 45 seconds

$$= \frac{1.8 \text{ m}}{45 \text{ s}}$$

$$= 0.04 \text{ m/s}$$

(c) Kelajuan dari K ke L

Speed from K to L

$$= \frac{0.4 \text{ m}}{8 \text{ min}}$$

$$= 0.05 \text{ km/min}$$

Kelajuan dari L ke M

Speed from L to M

$$= \frac{10 \text{ km}}{25 \text{ min}}$$

$$= 0.4 \text{ km/min}$$

Kelajuan dari M ke N

Speed from M to N

$$= \frac{2.5 \text{ km}}{3 \text{ min}}$$

$$= 0.83 \text{ km/min}$$

Maka, kelajuan Hael dalam pertandingan itu adalah tak seragam.

Thus, the speed of Hael in the competition is non-uniform.

6. (a)

162 km/j 162 km/h	→	$\frac{162 \text{ km}}{1 \text{ j (h)}}$	→	$\frac{162 \times 1\,000 \text{ m}}{1 \times 60 \times 60 \text{ s}}$	→	<u>45</u> m/s
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(b)

12 m/minit 12 m/minute	→	$\frac{12 \text{ m}}{1 \text{ min}}$	→	$\frac{12 \times 100 \text{ cm}}{1 \times 60 \text{ s}}$	→	<u>20</u> cm/s
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(c)

240 m/minit 240 m/minute	→	$\frac{240 \text{ m}}{1 \text{ min}}$	→	$\frac{(240 \div 1\,000) \text{ km}}{(1 \div 60) \text{ j (h)}}$	→	<u>14.4</u> km/j km/h
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7. (a) Laju purata/ Average speed

$$= \frac{(15 + 1 + 25) \text{ km}}{\left(2 + \frac{25}{60}\right) \text{ jam/ hour}}$$

← 1 000 m = 1 km

$$= \frac{41 \text{ km}}{2\frac{5}{12} \text{ jam/ hour}}$$

$$= 16.97 \text{ km/j (16.97 km/h)}$$

(b) Laju purata/ Average speed

$$= \frac{(45 \times 2 \times 2) \text{ km}}{(2 + 2.5) \text{ j (h)}}$$

$$= \frac{180}{4.5}$$

$$= 40 \text{ km/j (km/h)}$$

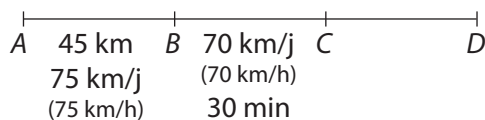
(c) Laju purata/ Average speed

$$= \frac{(60 \times 4 + 90 \times 1) \text{ km}}{(4 + 1) \text{ j (h)}}$$

$$= \frac{330}{5}$$

$$= 66 \text{ km/j (km/h)}$$

8.



Jumlah masa/ Total time = $\frac{300 \text{ km}}{80 \text{ km/j (km/h)}}$

$$= 3.75 \text{ jam / hours}$$

Masa dari Bandar A ke Bandar B

Time from Town A to Town B

$$= \frac{45 \text{ km}}{75 \text{ km/j (km/h)}}$$

$$= 0.6 \text{ jam / hours}$$

Masa dari Bandar C ke Bandar D

Time from Town C to Town D

$$= 3.75 - 0.6 - \frac{30}{60}$$

$$= 2.65 \text{ jam / hours}$$

Jarak dari Bandar B ke Bandar C

Distance from Town B to Town C

$$= 70 \text{ km/j} \times \left(\frac{30}{60}\right) \text{ j (70 km/h} \times \left(\frac{30}{60}\right) \text{ h)}$$

$$= 35 \text{ km}$$

Jarak dari Bandar C ke Bandar D

Distance from Town C to Town D

$$= 300 - 45 - 35$$

$$= 220 \text{ km}$$

Laju dari Bandar C ke Bandar D

Speed from Town C to Town D

$$= \frac{220 \text{ km}}{2.65 \text{ j (h)}}$$

$$= 83.02 \text{ km/j (83.02 km/h)}$$

(b) (i) Tempoh masa/ Length of time

$$= 9 - 5$$

$$= 4 \text{ s}$$

(ii) Laju/ Speed

$$= \frac{(55 - 0) \text{ m}}{5 \text{ s}}$$

$$= 11 \text{ m/s}$$

$$= \frac{(11 \div 1\,000) \text{ km}}{(1 \div 60) \text{ min}}$$

$$= 0.66 \text{ km per min}$$

(iii) Laju purata/ Average speed

$$= \frac{55 \text{ m}}{9 \text{ s}}$$

$$= 6.11 \text{ m/s}$$

(c) Jarak di antara bandar P dan bandar Q

Distance between town P and town Q

$$= 80 \text{ km/j} \times 2\frac{1}{2} \text{ j} \left(80 \text{ km/h} \times 2\frac{1}{2} \text{ h} \right)$$

$$= 200 \text{ km}$$

Kelajuan dari bandar Q ke bandar R

Speed from town Q to town R

$$= 80 \times 125\%$$

$$= 100 \text{ km/j} \text{ (km/h)}$$

Masa yang diambil dari bandar Q ke bandar R

Time taken from town Q to town R

$$= \frac{150 \text{ km}}{100 \text{ km/j} \text{ (km/h)}}$$

$$= 1\frac{1}{2} \text{ jam} \text{ (hours)}$$

Jumlah masa yang diambil

Total time taken

$$= 2\frac{1}{2} + 1\frac{1}{2}$$

$$= 4 \text{ jam} \text{ (hours)}$$

Jumlah jarak yang dilalui

Total distance travelled

$$= 200 + 150$$

$$= 350 \text{ km}$$

Laju purata bagi seluruh perjalanan

Average speed for the whole journey

$$= \frac{350 \text{ km}}{4 \text{ j} \text{ (h)}}$$

$$= 87.5 \text{ km/j} \text{ (km/h)}$$

(d)

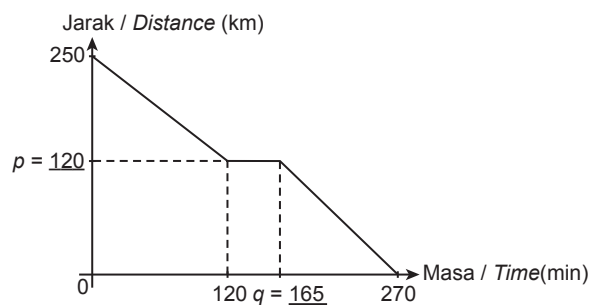
(i) (a)



$$p = 250 - 130 = 120 \text{ km}$$

$$q = 120 + 45 = 165 \text{ minit/ minutes}$$

(b)

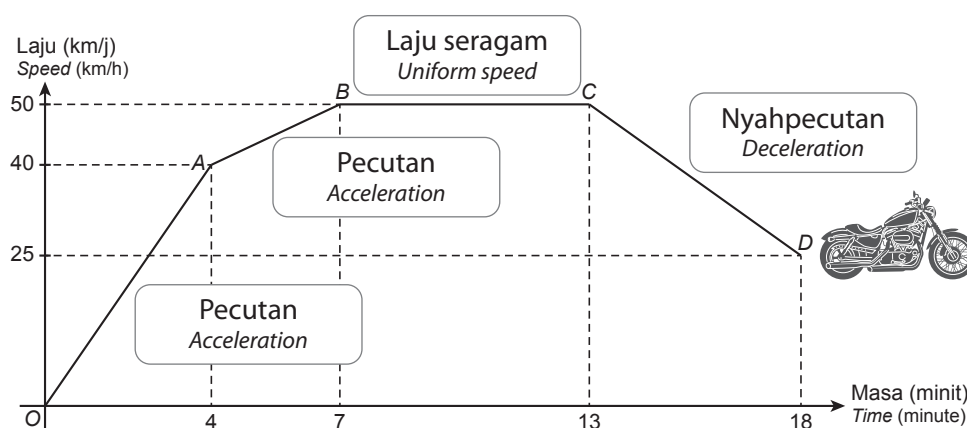


(ii) Laju purata/ Average speed

$$= \frac{250 \text{ km}}{(270 \div 60) \text{ jam/ hours}}$$

$$= 55.56 \text{ km/j} \text{ (55.56 km/h)}$$

9.



Masa (min) Time (min)	Laju awal (km/j) Initial speed (km/h)	Laju akhir (km/j) Final speed (km/h)	Pecutan Acceleration = $\frac{\text{Perubahan laju}}{\text{Masa yang diambil}}$ $\frac{\text{Change of speed}}{\text{Times taken}}$ km/j per min (km/h per min)
Graf OA/ Graph of OA $4 - 0 = 4$	0	40	$\frac{40 - 0}{4} = 10$
Graf AB/ Graph of AB $7 - 4 = 3$	40	50	$\frac{50 - 40}{3} = 3.3$
Graf BC/ Graph of BC $13 - 7 = 6$	50	50	$\frac{50 - 50}{6} = 0$
Graf CD/ Graph of CD $18 - 13 = 5$	50	25	$\frac{25 - 50}{5} = -5$

Berdasarkan jadual di atas,

Based on the above table,

- pecutan ialah suatu kadar yang melibatkan laju dan masa.
acceleration is a ratio involving speed and time.
- pecutan ialah peningkatan kelajuan terhadap masa dan dikenali sebagai pecutan positif.
acceleration is the increase in speed over time and known as positive acceleration.
- nyahpecutan ialah pengurangan kelajuan terhadap masa dan dikenali sebagai pecutan negatif.
deceleration is the decrease in speed over time and known as negative acceleration.

10. (a) Pecutan/ Acceleration

$$= \frac{(90 - 60) \text{ km/j (km/h)}}{5 \text{ s}}$$

$$= 6 \text{ km/j per saat}$$

6 km/h per second

(b) Pecutan/ Acceleration

$$= \frac{(0 - 15) \text{ m/s}}{3 \text{ s}}$$

$$= -5 \text{ m/s}^2$$

atau/ or

$$\text{Nyahpecutan/ Deceleration} = 5 \text{ m/s}^2$$

(c) Pecutan / Acceleration

$$= \frac{(80 - 110) \text{ km/j (km/h)}}{4 \text{ s}}$$

$$= -7.5 \text{ km/j per saat}$$

-7.5 km/h per second

atau/ or

$$\text{Nyahpecutan/ Deceleration}$$

$$= 7.5 \text{ km/j per saat}$$

7.5 km/h per second

(d) Pecutan / Acceleration

$$= \frac{(30 - 0) \text{ m/s}}{15 \text{ s}}$$

$$= \frac{(30 \div 1\,000) \text{ km}}{(1 \div 3\,600) \text{ j}} \times \frac{1}{15 \text{ s}}$$

$$= 7.2 \text{ km/j per saat}$$

7.2 km/h per second

(e) (i) (a) Masa = $20 \text{ min} \times \frac{1}{60}$

Time = $\frac{1}{3} \text{ jam / hour}$

Pecutan/ Acceleration

$$= \frac{(110 - 80) \text{ km/j (km/h)}}{\left(\frac{1}{3}\right) \text{ j (h)}}$$

$$= 90 \text{ km/j per jam}$$

90 km/h per hour

(b) Masa/ Time = 20 min

$$= 20 \times 60 \text{ s}$$

$$= 1\,200 \text{ s}$$

Pecutan/ Acceleration

$$= \frac{(110 - 80) \text{ km/j (km/h)}}{1\,200 \text{ s}}$$

$$= 0.025 \text{ km/j per saat}$$

0.025 km/h per second

11. (a) (i) Perubahan laju/ Change in speed

$$= \text{Pecutan} \times \text{Masa yang diambil}$$

Acceleration $\times$ Time taken

$$= 2 \times 5$$

$$= 10 \text{ m/s}$$

Katakan laju akhir / Let the final speed

$$= v$$

$$v - 10 = 10$$

$$v = 10 + 10$$

$$= 20 \text{ m/s}$$

$$\begin{aligned} \text{(ii) Masa yang diambil} &= \frac{\text{Perubahan laju}}{\text{Pecutan}} \\ \text{Time taken} &= \frac{\text{Change in speed}}{\text{Acceleration}} \\ &= \frac{30 - 10}{2} \\ &= 10 \text{ s} \end{aligned}$$

- (b) Katakan laju kereta apabila bertemu = v
Let the speed of the car when they meet = v

Kereta / Car A

$$7 = \frac{v_A - 50}{8}$$

$$\begin{aligned} v_A - 50 &= 56 \\ v_A &= 106 \text{ km/j (km/h)} \end{aligned}$$

Kereta / Car B

$$8 = \frac{v_B - 40}{8}$$

$$\begin{aligned} v_B - 40 &= 64 \\ v_B &= 104 \text{ km/j (km/h)} \end{aligned}$$

- (c) Pecutan motosikal S
Acceleration of motorcycle S
- $$\begin{aligned} &= \frac{\left(\frac{1}{8} \times 218\right) \text{ km/j (km/h)}}{5 \text{ s}} \\ &= 5.45 \text{ km/j per s (km/h per s)} \end{aligned}$$

Pecutan motosikal T
Acceleration of motorcycle T

$$\begin{aligned} &= \frac{(242 - 218) \text{ km/j (km/h)}}{6 \text{ s}} \\ &= 4 \text{ km/j per s (km/h per s)} \end{aligned}$$

Beza pecutan
Difference in acceleration

$$\begin{aligned} &= 5.45 - 4 \\ &= 1.45 \text{ km/j per s (km/h per s)} \end{aligned}$$

- (d) (i) Tempoh masa/ Duration of time
- $$\begin{aligned} &= 1.5 - 0.8 \\ &= 0.7 \text{ jam (hour)} \\ &= 42 \text{ minit (minutes)} \end{aligned}$$
- (ii) Pecutan pada 0.8 jam pertama
Acceleration in the first 0.8 hour
- $$\begin{aligned} &= \frac{(85 - 0) \text{ km/j (km/h)}}{(0.8 - 0) \text{ j (h)}} \\ &= 106.3 \text{ km/j}^2 \text{ (km/h}^2\text{)} \end{aligned}$$
- (iii) Pecutan/ Acceleration
- $$\begin{aligned} &= \frac{(60 - 85) \text{ km/j (km/h)}}{(1.8 - 1.5) \text{ j (h)}} \\ &= -83.3 \text{ km/j}^2 \text{ (km/h}^2\text{)} \end{aligned}$$
- Maka, nyahpecutan = 83.3 km/j^2
Thus, deceleration = 83.3 km/h^2

- (iv) Pecutan pada 0.4 jam terakhir
Acceleration in the last 0.4 hour
- $$\begin{aligned} &= \frac{(110 - 60) \text{ km/j (km/h)}}{(2.2 - 1.8) \text{ j (h)}} \\ &= 125 \text{ km/j}^2 \text{ (km/h}^2\text{)} \end{aligned}$$

Ya, Xue Wen memecut dengan lebih laju pada 0.4 jam terakhir berbanding 0.8 jam pertama ($125 \text{ km/j}^2 > 106.3 \text{ km/j}^2$).
Yes, Xue Wen accelerates faster in the last 0.4 hour than in the first 0.8 hour ($125 \text{ km/h}^2 > 106.3 \text{ km/h}^2$)

Power PT3

Bahagian

- Laju / Speed
$$\begin{aligned} &= \frac{\text{jarak / distance}}{\text{masa / time}} \\ &= \frac{150}{10} \\ &= 15 \text{ m/min} \end{aligned}$$

Jawapan / Answer: **A**

- $240 \text{ km} = 240 \times 1\,000 = 240\,000 \text{ m}$
1 jam / hour = 60 minit / minutes
$$\frac{240\,000}{60} = 4\,000 \text{ m/min}$$

Jawapan / Answer: **C**

- Jarak / Distance
$$\begin{aligned} &= \text{Laju / Speed} \times \text{Masa / Time} \\ &= 100 \times 4.5 \\ &= 450 \text{ km} \end{aligned}$$

Jawapan / Answer: **B**

- Laju / Speed
$$\begin{aligned} &= \frac{90 + 112 + 68}{1.25 + 2.5 + 0.75} \\ &= \frac{270}{4.5} \\ &= 60 \text{ km/j} \\ &60 \text{ km/h} \end{aligned}$$

Jawapan / Answer: **C**

Bahagian B

5.

Laju Speed	Jarak Distance	Masa Time
20 m/s	400 m	20 saat 20 second
90 km/j 90 km/h	243 km	2.7 jam 2.7 hours
110 km/j 110 km/h	550 km	5 jam 5 hours
80 km/j 80 km/h	100 km	1.25 jam 1.25 hours

Jarak / Distance
 $= 20 \text{ m/s} \times 20 \text{ s}$
 $= 400 \text{ m}$

Laju / Speed
 $= \frac{243 \text{ km}}{2.7 \text{ jam/hours}}$
 $= 90 \text{ km/j}$
 90 km/h

Masa / Time
 $= \frac{550 \text{ km}}{110 \text{ km/j (km/h)}}$
 $= 5 \text{ jam/hours}$

Masa / Time
 $= \frac{100 \text{ km}}{80 \text{ km/j (km/h)}}$
 $= 1.25 \text{ jam/hours}$

6. (a)

	Hasan	Hafiz
Masa (j) Time (h)	2	3
Jarak (km) Distance (km)	45	72
Laju (km/j) Speed (km/h)	22.5	24

Laju Hasan
 Hasan's speed
 $= \frac{45 \text{ km}}{2 \text{ jam/hours}}$
 $= 22.5 \text{ km/j (km/h)}$

Laju Hafiz
 Hafiz's speed
 $= \frac{72 \text{ km}}{3 \text{ jam/hours}}$
 $= 24 \text{ km/j (km/h)}$

(b)

Laju awal Initial speed	Laju akhir Final speed	Masa diambil Time taken	Pecutan/Nyahpecutan Acceleration/Deceleration
22 m/s	26 m/s	4 saat 4 seconds	$\frac{26 - 22}{4} = \frac{4}{4} = 1 \text{ m/s}^2$ Pecutan / Acceleration
90 km/j 90 km/h	75 km/j 75 km/h	2.5 jam 2.5 hours	$\frac{75 - 90}{2.5} = \frac{-15}{2.5}$ $= -6 \text{ km/j}^2 (-6 \text{ km/h}^2)$ Nyahpecutan / Deceleration

Bahagian C

7. (a) Hitung laju bagi setiap situasi di bawah.
 Calculate the speed for each situation below.

(i) $\frac{353.4 \text{ km}}{6.2 \text{ j (h)}} = 57 \text{ km/j (km/h)}$

(ii) $\frac{1\,500 \text{ m}}{5 \text{ min}} = 300 \text{ m/min}$

- (b) Kelajuan 2 jam pertama = $\frac{120}{2}$
 The speed of the first 2 hours
 $= 60 \text{ km/j (60 km/h)}$

Kelajuan seterusnya = $\frac{150}{2.5}$
 The next speed
 $= 60 \text{ km/j (60 km/h)}$

Adam memandu dengan kelajuan seragam.
 Adam drives at a uniform speed.

(c) (i) Masa / Time = $\frac{29.6 \times 1\,000}{1\,480}$
 $= 20 \text{ s}$

(ii) Jarak / Distance = $75 \times \frac{45}{60}$
 $= 56.25 \text{ km}$

8. (a) (i) Jarak / Distance
 $= 100 \times 1$
 $= 100 \text{ km}$

(ii) Masa / Time
 $= \frac{242}{100}$
 $= 2.42 \text{ jam / hours}$
 $= 2 \text{ jam } 25 \text{ minit}$
 $2 \text{ hours } 25 \text{ minutes}$

$$\begin{aligned} \text{(b) Masa / Time} &= \frac{12}{60} \\ &= 0.2 \text{ jam} \\ &= 0.2 \text{ hour} \end{aligned}$$

$$\begin{aligned} \text{Pecutan / Acceleration} \\ &= \frac{0 - 280}{0.2} \end{aligned}$$

$$\begin{aligned} &= -1\,400 \text{ km/j}^2 \\ &= (-1\,400 \text{ km/h}^2) \end{aligned}$$

$\therefore$ Nyahpecutan

Deceleration

$$\begin{aligned} &= 1\,400 \text{ km/j}^2 \\ &= (1\,400 \text{ km/h}^2) \end{aligned}$$

$$\text{(c) Jarak / Distance}$$

$$= 70 \times \frac{30}{60}$$

$$= 35 \text{ km}$$

Baki jarak / *Remaining distance*

$$= 70 - 35$$

$$= 35 \text{ km}$$

Masa untuk baki jarak / *Time for remaining distance*

$$= \frac{35}{75} \text{ jam / hour}$$

$$= \frac{7}{15} \text{ jam / hours}$$

$$= 28 \text{ minit / minutes}$$

Masa untuk Narveen tiba / *Time for Narveen arrived*

$$= 1:40 \text{ p.m.} + 30 \text{ minit / minutes}$$

$$+ 28 \text{ minit / minutes}$$

$$= 2:38 \text{ p.m.}$$

$\therefore$ Narveen akan tiba lewat 8 minit ke mesyuarat itu.

Narveen will arrive 8 minutes late to the meeting.

Power KBAT

1. Jumlah masa dari Ipoh ke Kuala Lumpur

Total time from Ipoh to Kuala Lumpur

$$= 1130 - 0900$$

$$= 2 \text{ jam } 30 \text{ minit (2 hours 30 minutes)}$$

$$= 2.5 \text{ jam (hours)}$$

Jumlah jarak dari Ipoh ke Kuala Lumpur

Total distance from Ipoh to Kuala Lumpur

$$= 82 \times 2.5$$

$$= 205 \text{ km}$$

Masa yang diambil dari Tanjung Malim ke Kuala Lumpur

Time taken from Tanjung Malim to Kuala Lumpur

$$= 1130 - 1030$$

$$= 1 \text{ jam (hour)}$$

Jarak dari Tanjung Malim ke Kuala Lumpur

Distance from Tanjung Malim to Kuala Lumpur

$$= 80 \times 1$$

$$= 80 \text{ km}$$

Jarak di antara Ipoh dengan Tanjung Malim

Distance between Ipoh and Tanjung Malim

$$= 205 - 80$$

$$= 125 \text{ km}$$

2. (i) 6 saat hingga 10 saat

6 seconds until 10 seconds

(ii) 0 saat hingga 6 saat

0 seconds until 6 seconds

(iii) Masa / Time = 2 s

Perubahan laju / Change in speed

$$= 20 - 10$$

$$= 10 \text{ m/s}$$

Pecutan / Acceleration

$$= \frac{10 \text{ m/s}}{2 \text{ s}}$$

$$= 5 \text{ m/s}^2$$