



1. Atlet, Tahun <i>Athlete, Year</i>	Jarak (m) <i>Distance (m)</i>	Masa (s) <i>Time (s)</i>	Laju (m/s) <i>Speed (m/s)</i>
Usain Bolt, 2016	100	9.81	$\frac{100}{9.81} = 10.19$
Justin Gatlin, 2004	100	9.85	$\frac{100}{9.85} = 10.15$
Maurice Greene, 2000	100	9.87	$\frac{100}{9.87} = 10.13$

(a) terpendek; tertinggi
shortest; highest

(b) terpanjang; terendah
longest; lowest

2. (a) $\text{Laju / Speed} = \frac{200 \text{ m}}{10 \text{ min}}$
 $= 20 \text{ m/min}$

(b) $\text{Laju / Speed} = \frac{5 \text{ cm}}{0.5 \text{ s}}$
 $= 10 \text{ cm/s}$

(c) $\text{Laju / Speed} = \frac{5 \text{ km}}{40 \text{ min}}$
 $= 0.125 \text{ km/min}$

3. (a) Jarak / Distance
 $= 0.4 \text{ m/s} \times 220 \text{ s} = 88 \text{ m}$

(b) Jarak / Distance
 $= 30 \text{ km/s} \times \left(\frac{1}{2} \times 60 \times 60\right) \text{ s}$
 $= 54\,000 \text{ km}$

Tukar jam kepada
saat.
Convert hour to second.

(c) Masa / Time
 $= \frac{4 \text{ km}}{65 \text{ km/j (km/h)}} = 0.062 \text{ jam / hour}$

(d) Masa / Time
 $= \frac{80 \text{ m}}{6.8 \text{ m/s}} = 11.76 \text{ s}$

4. (a) Laju tak seragam / *Non-uniform speed*

Justifikasi / Justification

Atlet bergerak dengan perubahan jarak yang berbeza dalam selang masa yang sama.
The athlete moves at unequal distance in equal time interval.

(b) Laju seragam / *Uniform speed*

Justifikasi / Justification

Kereta bergerak dengan perubahan jarak yang sama dalam selang masa yang sama.
The car moves at equal distance in equal time interval.

5. (a) Kelajuan pada 60 m pertama
Speed for the first 60 m

$$= \frac{60 \text{ m}}{7 \text{ s}}$$

$$= 8.57 \text{ m/s}$$

Kelajuan pada 40 m seterusnya
Speed for the next 40 m

$$= \frac{40 \text{ m}}{4 \text{ s}}$$

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

Maka, kelajuan atlet itu adalah tidak seragam.

Thus, the speed of the athlete is non-uniform.

(b) Kelajuan bola dari Auni kepada Lulu
Speed of the ball from Auni to Lulu

$$= \frac{5 \text{ m}}{1 \text{ s}}$$

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

Kelajuan bola dari Lulu ke Zara
Speed of the ball from Lulu to Zara

$$= \frac{7.5 \text{ m}}{1.5 \text{ s}}$$

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

Maka, kelajuan bola itu adalah seragam.

Thus, the speed of the ball is uniform.

- (c) Kelajuan helang di langit

Speed of the eagle in the sky

$$= \frac{20 \text{ m}}{5 \text{ s}} = 4 \text{ m/s}$$

Kelajuan helang semasa menjunam

Speed of the eagle when swooping down

$$= \frac{50 \text{ m}}{4 \text{ s}} = 12.5 \text{ m/s}$$

Kelajuan helang ketika mengangkat ikan

Speed of the eagle when lifting the fish

$$= \frac{30 \text{ m}}{5 \text{ s}} = 6 \text{ m/s}$$

Maka, kelajuan helang itu adalah tidak seragam.

Thus, the speed of the eagle is non-uniform.

6. (a) $\frac{162 \text{ km/j}}{162 \text{ km/h}} \rightarrow \frac{162 \text{ km}}{1 \text{ j (h)}} \rightarrow \frac{162 \times 1\,000 \text{ m}}{1 \times 60 \times 60 \text{ s}} \rightarrow \underline{45} \text{ m/s}$

(b) $\frac{12 \text{ m/minit}}{12 \text{ m/minute}} \rightarrow \frac{12 \text{ m}}{1 \text{ min}} \rightarrow \frac{12 \times 100 \text{ cm}}{1 \times 60 \text{ s}} \rightarrow \underline{20} \text{ cm/s}$

(c) $\frac{240 \text{ m/minit}}{240 \text{ m/minute}} \rightarrow \frac{240 \text{ m}}{1 \text{ min}} \rightarrow \frac{(240 \div 1\,000) \text{ km}}{(1 \div 60) \text{ j (h)}} \rightarrow \underline{14.4} \frac{\text{km/j}}{\text{km/h}}$

7. (a) Laju purata/ *Average speed*

$$= \frac{(15 + 1 + 25) \text{ km}}{\left(2 + \frac{25}{60}\right) \text{ jam/ hour}} \leftarrow \begin{array}{|c|} \hline 1\,000 \text{ m} = 1 \text{ km} \\ \hline \end{array}$$

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

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

- (b) Laju purata/ *Average speed*

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

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

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

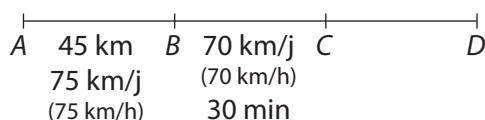
- (c) Laju purata/ *Average speed*

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

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

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

8.



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

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

Masa dari Bandar A ke Bandar B

Time from Town A to Town B

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

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

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

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

$$= 35 \text{ km}$$

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

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

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

Jumlah masa yang diambil

Total time taken

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

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

Jumlah jarak yang dilalui

Total distance travelled

$$= 200 + 150$$

$$= 350 \text{ km}$$

Laju purata bagi seluruh perjalanan

Average speed for the whole journey

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

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

(d)

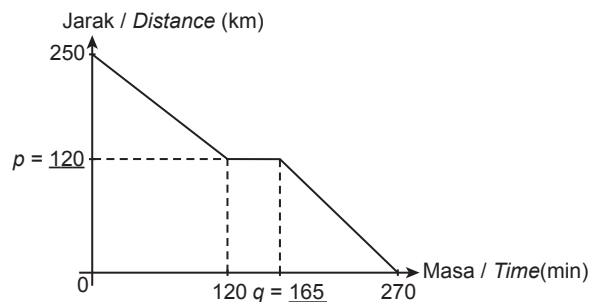
(i) (a)



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

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

(b)

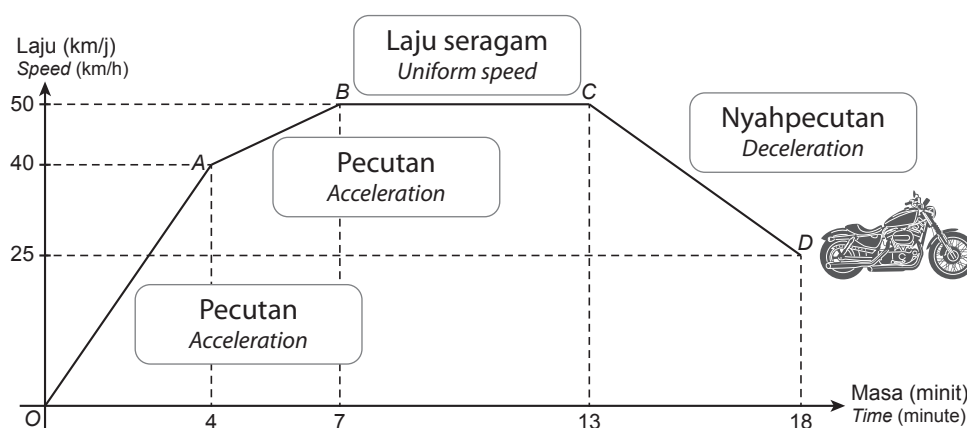


(ii) Laju purata/ Average speed

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

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

9.



Masa (min) Time (min)	Laju awal (km/j) Initial speed (km/h)	Laju akhir (km/j) Final speed (km/h)	Perubahan laju Change of speed Masa yang diambil Times taken Pecutan Acceleration $= \frac{\text{Change of speed}}{\text{Times taken}}$ 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

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

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

$$6 \text{ km/h per second}$$

(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

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

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

$$-7.5 \text{ km/h per second}$$

atau/ or

$$\text{Nyahpecutan/ Deceleration}$$

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

$$7.5 \text{ km/h per second}$$

(d) Pecutan / Acceleration

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

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

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

$$7.2 \text{ km/h per second}$$

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

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

Pecutan/ Acceleration

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

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

$$90 \text{ km/h per hour}$$

(b) Masa/ Time = 20 min

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

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

Pecutan/ Acceleration

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

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

$$0.025 \text{ km/h per second}$$

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

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

$$\text{Acceleration} \times \text{Time taken}$$

$$= 2 \times 5$$

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

Katakan laju akhir / Let the final speed

$$= v$$

$$v - 10 = 10$$

$$v = 10 + 10$$

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

(ii) Masa yang diambil = $\frac{\text{Perubahan laju}}{\text{Pecutan}}$

$$\begin{aligned} \text{Time taken} &= \frac{\text{Change in speed}}{\text{Acceleration}} \\ &= \frac{30 - 10}{2} \\ &= 10 \text{ s} \end{aligned}$$

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

Kereta / Car A

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

$$v_A - 50 = 56$$

$$v_A = 106 \text{ km/j (km/h)}$$

Kereta / Car B

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

$$v_B - 40 = 64$$

$$v_B = 104 \text{ km/j (km/h)}$$

- (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
 $= 1.5 - 0.8$
 $= 0.7 \text{ jam (hour)}$
 $= 42 \text{ minit (minutes)}$
- (ii) Pecutan pada 0.8 jam pertama
 Acceleration in the first 0.8 hour
 $= \frac{(85 - 0) \text{ km/j (km/h)}}{(0.8 - 0) \text{ j (h)}}$
 $= 106.3 \text{ km/j}^2 \text{ (km/h}^2\text{)}$
- (iii) Pecutan / Acceleration
 $= \frac{(60 - 85) \text{ km/j (km/h)}}{(1.8 - 1.5) \text{ j (h)}}$
 $= -83.3 \text{ km/j}^2 \text{ (km/h}^2\text{)}$
- 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
 $= \frac{(110 - 60) \text{ km/j (km/h)}}{(2.2 - 1.8) \text{ j (h)}}$
 $= 125 \text{ km/j}^2 \text{ (km/h}^2\text{)}$

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 ($125 \text{ km/h}^2 > 106.3 \text{ km/h}^2$)

Praktis Masteri 9

BAHAGIAN A

1. Laju purata / Average speed

$$\begin{aligned} &= \frac{150 \text{ m}}{10 \text{ min}} \\ &= 15 \text{ m/min} \end{aligned}$$

Jawapan / Answer: **A**

2. Masa yang diperlukan / Time needed

$$\begin{aligned} &= \frac{(60 - 0) \text{ m/s}}{7.5 \text{ m/s}^2} \\ &= 8 \text{ s} \end{aligned}$$

Jawapan / Answer: **A**

3. Pecutan / Acceleration

$$\begin{aligned} &= \frac{(60 - 20) \text{ km/j (km/h)}}{(15 - 0) \text{ s}} \\ &= \frac{40}{15} \\ &= 2.67 \text{ km/j per saat (km/h per second)} \end{aligned}$$

Jawapan / Answer: **C**

4. $50 \text{ km/j (km/h)} = \frac{50 \text{ km}}{1 \text{ j (h)}}$

$$\begin{aligned} &= \frac{(50 \times 1000) \text{ m}}{(1 \times 60 \times 60) \text{ s}} \\ &= 13.89 \text{ m/s} \end{aligned}$$

Jawapan / Answer: **B**

5. Jarak larian / Distance of his run

$$\begin{aligned} &= 8.4 \text{ km/j} \times (30 \div 60) \text{ j} \\ &= 8.4 \text{ km/h} \times (30 \div 60) \text{ h} \\ &= 4.2 \text{ km} \end{aligned}$$

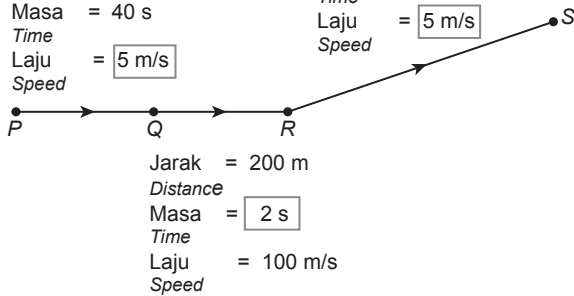
Jawapan / Answer: **A**

BAHAGIAN B

6.

Jarak = 200 m
Distance
Masa = 40 s
Time
Laju = 5 m/s
Speed

Jarak = 500 m
Distance
Masa = 100 s
Time
Laju = 5 m/s
Speed



Laju dari P ke Q / Speed from P to Q

$$= \frac{200 \text{ m}}{40 \text{ s}} \\ = 5 \text{ m/s}$$

Masa yang diambil dari Q ke R

The time taken from Q to R

$$= \frac{200 \text{ m}}{100 \text{ m/s}} \\ = 2 \text{ s}$$

Laju dari R ke S / Speed from R to S

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

Jarak dari R ke S / Distance from R to S

$$= 5 \text{ m/s} \times 100 \text{ s} \\ = 500 \text{ m}$$

$$7. \quad 100 \text{ km/j} / 100 \text{ km/h} = \frac{100 \text{ km}}{1 \text{ jam} / \text{hour}} \\ = \frac{(100 \times 1\,000) \text{ m}}{(1 \times 60 \times 60) \text{ s}} \\ = 27.78 \text{ m/s}$$

BAHAGIAN C

8. (a) (i) Laju sebelum mencecah tanah

Speed before touches the ground

$$10 = \frac{v - 0}{2} \\ v = 10 \times 2 \\ = 20 \text{ m/s}$$

$$(ii) \quad 20 \text{ m/s} = \frac{(20 \div 1\,000)}{(1 \div 3\,600)} \\ = 72 \text{ km/j} (\text{km/h})$$

(b) (i) 200 km

(ii) Laju purata / Average speed

$$= \frac{200 \text{ km}}{3 \text{ j} (\text{h})} \\ = 66.67 \text{ km/j} (\text{km/h})$$

(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

$$= \frac{35}{75} \text{ jam} / \text{hour} \\ = \frac{7}{15} \text{ jam} / \text{hours} \\ = 28 \text{ minit} / \text{minutes}$$

Masa untuk Narveen tiba / Time for Narveen arrived

$$= 1:40 \text{ p.m.} + 30 \text{ minit} / \text{minutes} \\ + 28 \text{ minit} / \text{minutes} \\ = 2:38 \text{ p.m.}$$

∴ Narveen akan tiba lewat 8 minit ke mesyuarat itu.

Narveen will arrive 8 minutes late to the meeting.

Fokus KBAT

(a) Masa yang diambil / The time taken

$$= \frac{480 \text{ km}}{120 \text{ km/j} (\text{km/h})} \\ = 4 \text{ jam} / \text{hours}$$

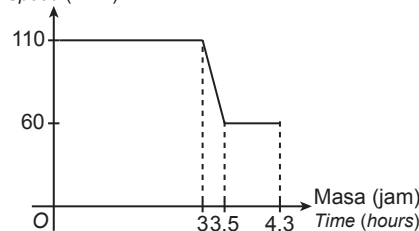
Waktu tiba / Arrival time

$$= 5 \text{ a.m.} + 4 \text{ jam} / \text{hours} \\ = 9 \text{ a.m.}$$

Maka, Encik Hussien tidak boleh sampai ke destinasi sebelum pukul 8 a.m. jika dia bertolak pada pukul 5 a.m. dari rumahnya.

Thus, Encik Hussien cannot reach his destination before 8 a.m. if he leaves at 5 a.m. from his house.

(b) Laju (km/j)
Speed (km/h)



Pecutan / Acceleration

$$= \frac{(60 - 110) \text{ km/j} (\text{km/h})}{0.5 \text{ j} (\text{h})} \\ = \frac{-50 \text{ km/j} (\text{km/h})}{0.5 \text{ j} (\text{h})} \\ = -100 \text{ km/j}^2 (\text{km/h}^2)$$