ملخص الوحدة الثالثة Motion Accelerated منهج انسباير مع تدريبات محلولة

تم تحميل هذا الملف من موقع المناهج الإماراتية
موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف العاشر المتقدم ⇦ فيزياء ⇦ الفصل الأول ⇦ ملفات متنوعة ⇦ الملف
تاريخ إضافة الملف على موقع المناهج: 2025-09-24 19:49:16

المزيد من مادة فيزياء:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

التواصل الاجتماعي بحسب الصف العاشر المتقدم					
صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف العاشر المتقدم والمادة فيزياء في الفصل الأول	
1	تجميعة أسئلة امتحانات وزارية نهائية منهج انسباير وبريدج
2	أسئلة Quiz على الدرس الثاني properties Wave من الوحدة الأولى منهج انسباير
3	أوراق عمل الدرس الثاني Properties Wave من الوحدة الأولى waves and Vibrations منهج انسباير
4	أسئلة Quiz على الدرس الأول Motion Periodic من الوحدة الأولى منهج انسباير
5	أوراق عمل الدرس الأول Motion Periodic من الوحدة الأولى waves and Vibrations

Chapter 3 : Accelerated Motion

big idea : acceleration is the rate of change in an object's velocity
sections : 1- Acceleration
2- Motion withe constant acceleration
3- free fall

Section 1 : Acceleration.

main idea : an object accelerates when its velocity change- that is , when it speed up.slow down, or changes direction.

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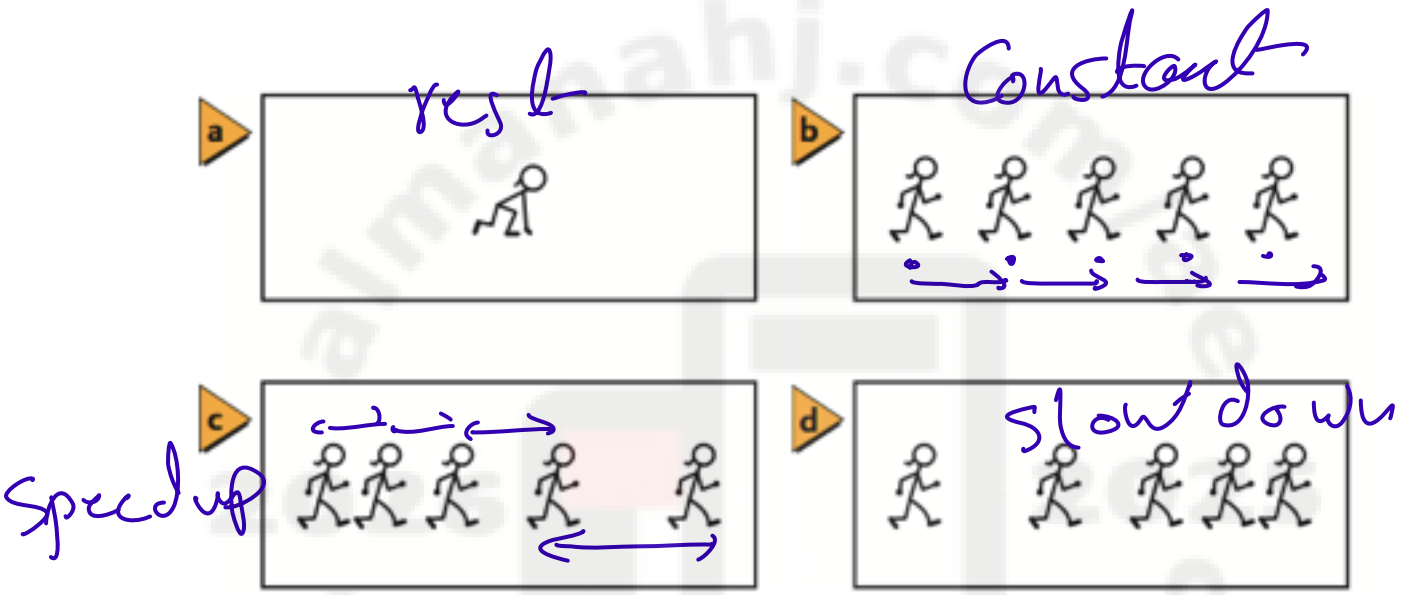
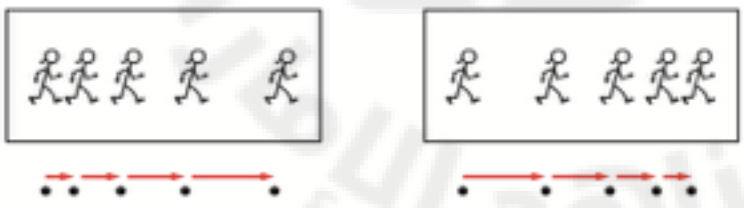
Objects do not always move at constant velocities. Understanding accelerated motion will help you better describe the motion of many objects.

how would you describe the motion of the person in figure?



particle model diagram



The particle-model version of the motion diagram indicates the runner's changing velocity not only by the change in spacing of the position dots, but also by the change in length of the velocity vectors.

the arrow is velocity vector

Displaying acceleration on a motion diagram.

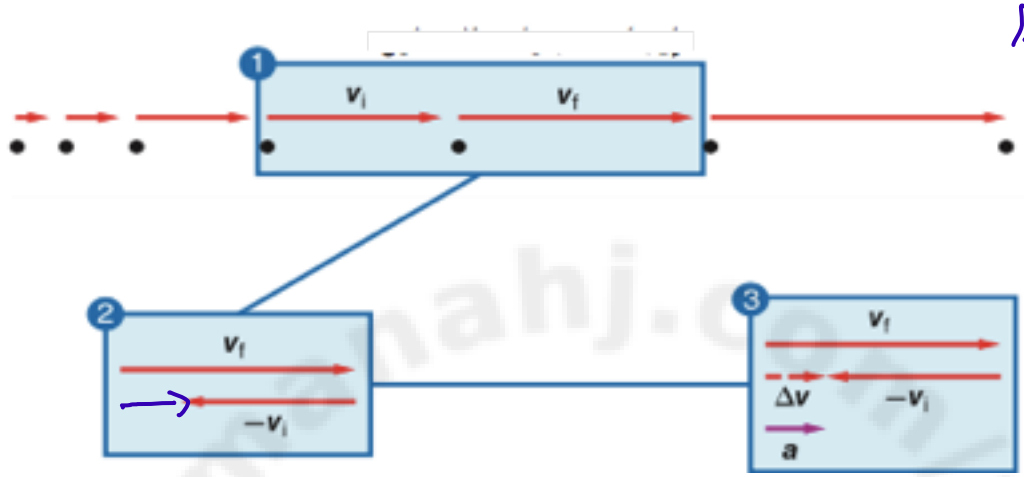
Acceleration : it is the rate at which an object's velocity changes .

Acceleration is a vector quality (has magnitude and direction).

You can drew the acceleration vector from tail of the final velocity to the tip of the initial velocity vector.

$a = \frac{V_f - V_i}{\Delta t}$

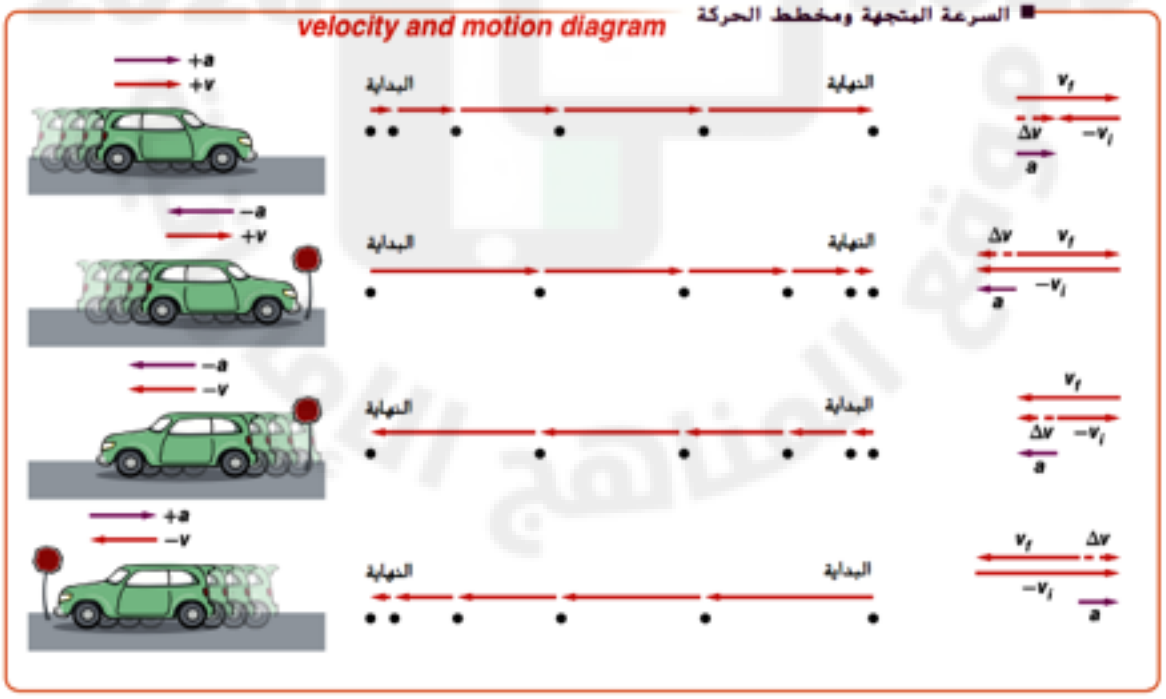
finding acceleration vector



First drew Vf, below that, drew Vi with its tail aligned with the tip of Vf

next, drew the vector △V from the tail of Vf to the tip of Vi . the acceleration vector **a** is the same as divided by the time interval.

Direction of Acceleration

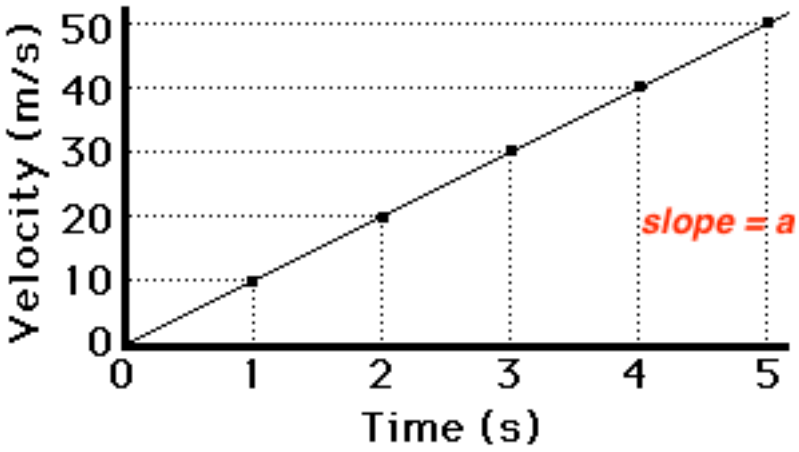


Velocity-Time Graphs

you can determine acceleration from a velocity-time graph by calculating the slope

slope = acceleration .

$$a = \frac{V_f - V_i}{\Delta t}$$



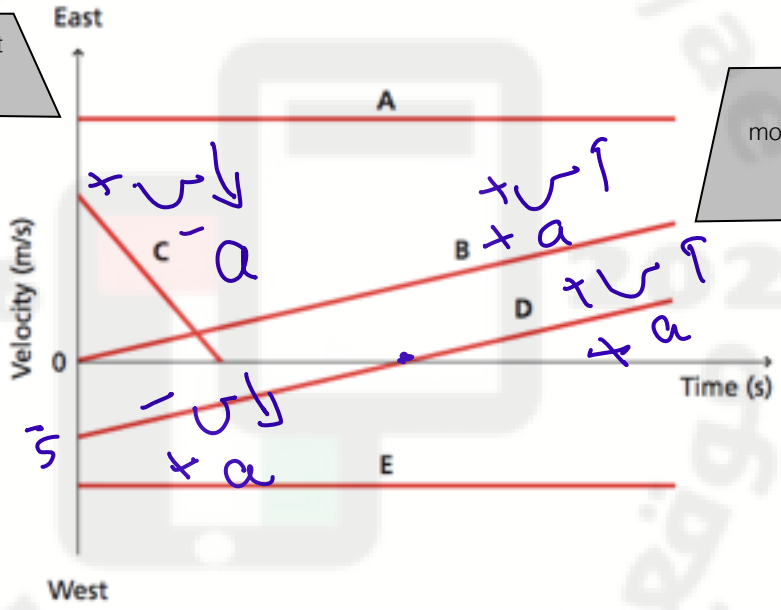
Reading velocity-time graph

the motion of five runners are shown in figure.

A & E: slope=0 → a=0 → A motion at constant velocity to the East

C:, slope (—) a (—)
motion begins with positive velocity, slows down then stops

D:, slope (+) a (+)
motion begins out toward the west, slow down, for an instance has zero velocity ,then move east velocity after that the speed increases



B : slope (+) a (+)
motion with positive velocity eastward the velocity increases,

Average and instantaneous Acceleration

Average acceleration is equal to the change in velocity, divided by the time it takes to make that change.
it is measured in meter per second per second (m/s/s) or meter per second squared (m/s2)

$$\bar{a} \equiv \frac{\Delta v}{\Delta t} = \frac{v_f - v_i}{t_f - t_i}$$

average acceleration depends of starting and ending velocity during time interval.

average acceleration **a = slope of (velocity- time) graph**

Instantaneous acceleration the change in an objet's velocity at an instant of time.

On velocity vs time graph, slope equals △v/△t.

You can determine the Instantaneous acceleration of an object by drawing a tangent line on the velocity-time graph at the point of time in which you want. then find the slope of this tangent line.

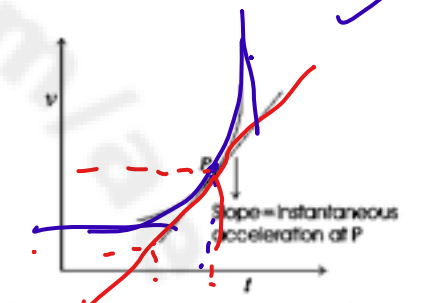
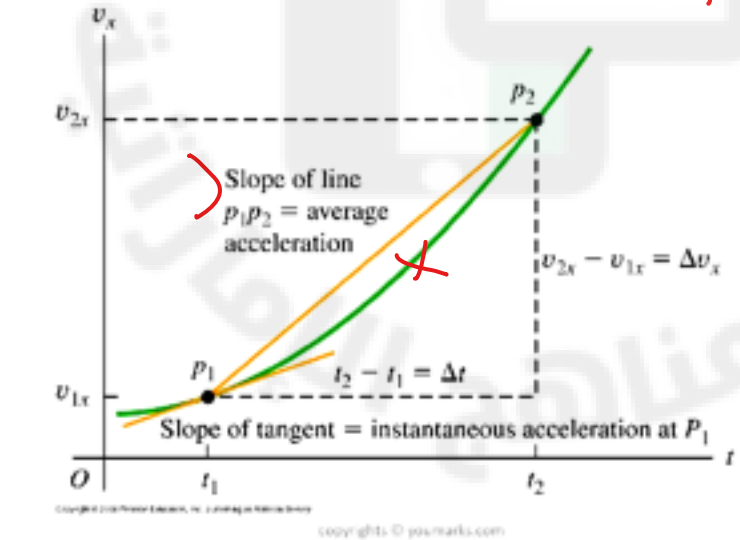


Figure 4. Velocity time graph of particle

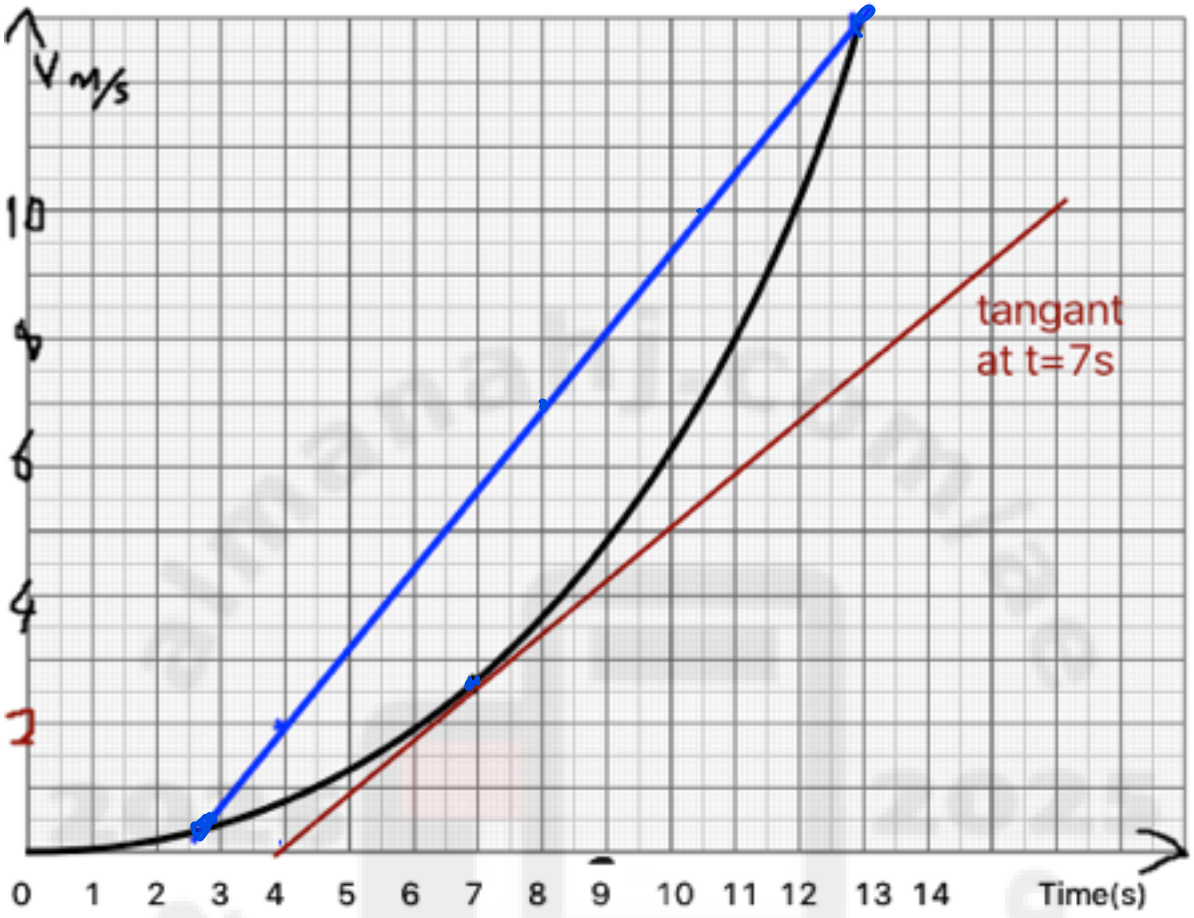


example

A curved line on a velocity-time graph shows that the acceleration is changing.

a.what is the average acceleration from t_i=3s to t_f=13s.?

b. What is the instantaneous acceleration at t=7s?



a. average acceleration = slope of the line passes in (t=3s ,t=13s)

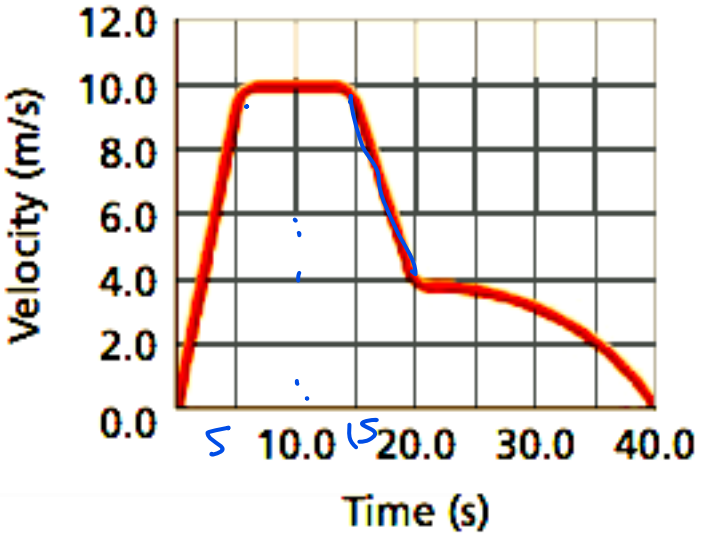
$$a = \frac{\Delta v}{\Delta t} = \frac{v2 - v1}{t2 - t1} = \frac{13 - 2}{13 - 4} = \frac{11}{9} = 1.22 m/s^2$$

b. instantaneous acceleration = slope of tangent at specific time.(t=7s)

$$a = \frac{v2 - v1}{t2 - t1} = \frac{6 - 0}{11 - 4} = 0.86 m/s^2$$

see example1 (book page,65)

4. Refer to Figure to find the average acceleration of the train during the following time intervals.



a. 0.0s to 5.0s

b. 15.0s to 20.0s

c. 0.0s to 40.0s

6. A race car's velocity increases from 4.0 m/s to 36 m/s over a 4.0-s time interval. What is its average acceleration?

7. A bus is moving at 25 m/s when the driver steps on the brakes and brings the bus to a stop in 3.0 s.

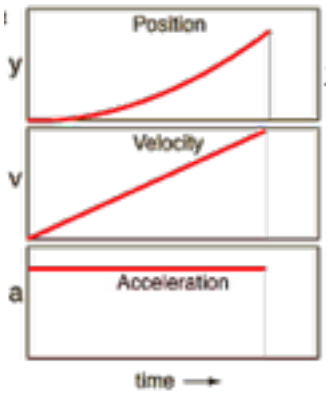
a. What is the average acceleration of the bus while braking?

b. If the bus took twice as long to stop, how would the acceleration compare with what you found in part a?

Section 3: Motion with Constant Acceleration

Position with Constant Acceleration

if an object move in constant acceleration ,its velocity changes at constant rate its velocity-time graph is straight line ,but the position -time graph is a parabola.



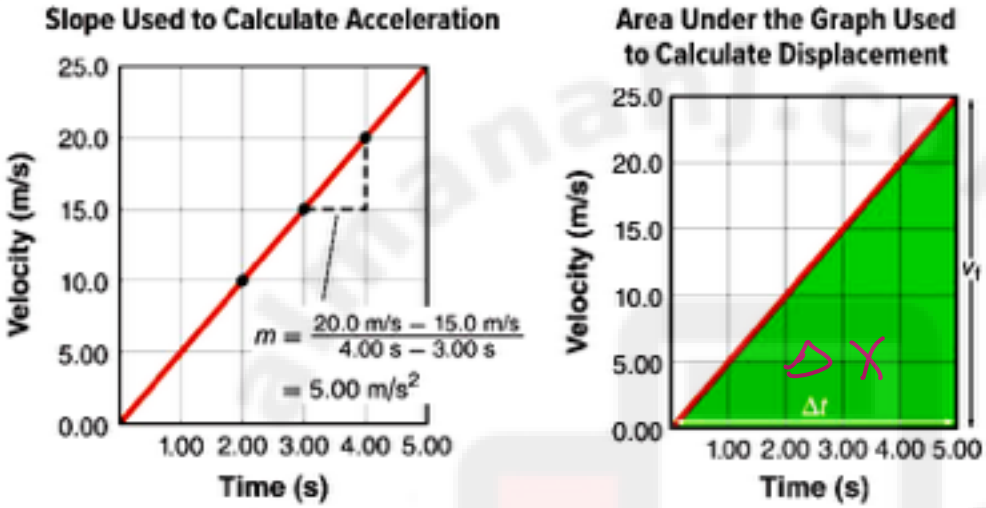


Figure 12 The slopes of the position-time graph in **Figure 11** are shown in these velocity-time graphs. The rise divided by the run gives the acceleration on the left. The area under the curve gives the displacement on the right.

Calculate What is the slope of the velocity-time graph on the left between $t = 2.00$ s and $t = 5.00$ s?

Velocity With Average Acceleration

you can recite the average acceleration a = △v/△t

$\triangle v = a \cdot \triangle t$

$v_f - v_i = a \cdot \triangle t$

the final velocity with average acceleration

$$V_f = V_i + a \triangle t$$

in case of the acceleration is constant, the average acceleration (a) is the same the instantaneous acceleration (a)

$$v_f = v_i + at$$

motion with an initial nonzero velocity

$$x_f = x_i + v_i t_f + \frac{1}{2} a t_f^2$$

$\triangle x=(x_f-x_i)$ —> or $\triangle x = v_i t + \frac{1}{2} a t^2$

an alternative equation

$$v_f^2 = v_i^2 + 2a(x_f - x_i)$$

or $v_f^2 = v_i^2 + 2 a \triangle x$

$\triangle x = \frac{1}{2} (v_i + v_f) t$

example 4 far → x long : t

An automobile starts at rest and accelerates at 3.5 m/s² after a traffic light turns green. How far will it have gone when it is travel in get 25 m/s?

analyse : xi=0 m vi=0m/s a=3.5m/s² xf=? vf=25m/s

choose equation :

$v_f^2 = v_i^2 + 2a(x_f - x_i)$

$(25)^2 = 0 + 2 \times 3.5 (x_f - 0)$

$25^2 = 2 \times 3.5 \times x_f \rightarrow x = 89.3\ m$

by: Taher

24- A race car travels on a straight racetrack with a forward velocity of 44 m/s and slows at a constant rate to a velocity of 22 m/s over 11 s. How far does it move during this time?

$v_i = 44$ m/s
$v_f = 22$ m/s
$\Delta t = 11$ s
$x_f = ?$
$x_i = 0$

$$(x_f - x_i) = \frac{1}{2}(v_i + v_f)\Delta t$$
$$x_f - 0 = \frac{1}{2}(44 + 22) \times 11$$
$$x_f = 363 \text{ m}$$

20-The graph in Figure 13 describes the motion of two cyclists, Ahmed (A) and Badr (B), who start from rest and travel north, increasing their speed with a constant acceleration. What was the total displacement of each cyclist during the time shown for each? Hint: _ 1 Use the area of a triangle: area= ½(base)(height)

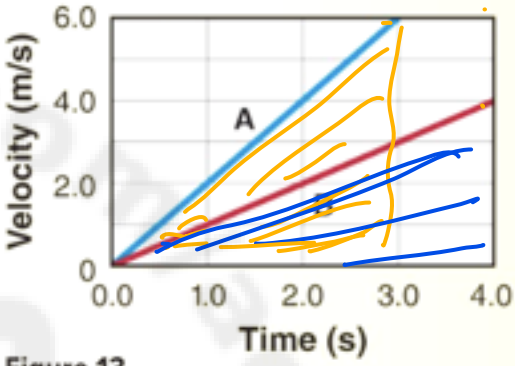


Figure 13

$$\Delta x_A = \frac{1}{2} b \cdot h$$
$$= \frac{1}{2} \times 3 \times 6 = 9 \text{ m}$$
$$\Delta x_B = \frac{1}{2} b h$$
$$= \frac{1}{2} \times 4 \times 4 = 8 \text{ m}$$
$$\Delta x_A > \Delta x_B$$

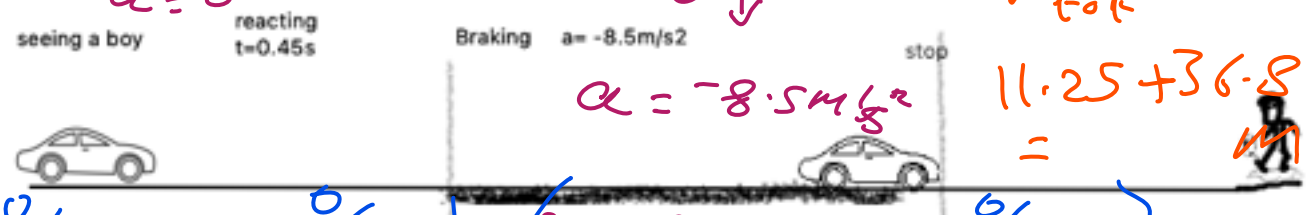
28-A car with an initial velocity of 24.5 m/s east has an acceleration of 4.2 m/s² west. What is its displacement at the moment that its velocity is 18.3 m/s east?

x_f v_f v_i $-a$ $+v$

$$v_f^2 = v_i^2 + 2a(x_f - x_i)$$
$$(18.3)^2 = (24.5)^2 + 2 \times -4.2 \times (x_f)$$
$$x_f = 31.6 \text{ m}$$

TWO-PART MOTION

You are driving a car, traveling at a constant velocity of 25 m/s along a straight road, when you see a child suddenly run onto the road. It takes 0.45 s for you to react and apply the brakes. As a result, the car slows with a steady acceleration of 8.5 m/s^2 in the direction opposite your motion and comes to a stop. What is the total displacement of the car before it stops?



v_i: constant
$a = 0$

v_f

v_i

$a = -8.5\ m/s^2$

$X_{tot} = X_1 + X_2$

$11.25 + 36.8$

$=$

$X_f = X_i + v_i t + \frac{1}{2} a t^2$

$= 25 \times 0.45$

$= 11.25\ m$

$v_f^2 = v_i^2 + 2a(x_f - x_i)$

$0 = 25^2 + 2 \times -8.5 \times X_f$

$X_f = 36.8\ m$