

ماكس بلانك في الفيزياء



تم تحميل هذا الملف من موقع المناهج الإماراتية

موقع المناهج ⇨ المناهج الإماراتية ⇨ الصف التاسع ⇨ فيزياء ⇨ الفصل الأول ⇨ ملفات متنوعة ⇨ الملف

تاريخ إضافة الملف على موقع المناهج: 00:32:18 2026-10-05

ملفات اكتب للمعلم اكتب 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

المزيد من مادة
فيزياء:

إعداد: إسلام سالم التواب

التواصل الاجتماعي بحسب الصف التاسع



صفحة المناهج
الإماراتية على
فيسبوك

المزيد من الملفات بحسب الصف التاسع والمادة فيزياء في الفصل الأول

ماكس بلانك

في الفيزياء



“ الفيزياء ليست مجرد معادلات ...
بل هي اللغة التي يفهم بها الكون نفسه ”



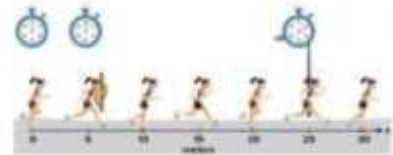
Mr Eslam Salem Eltwaab
— Physics —

Module 2: Representing Motion
First semester 2027

Section 2.1 picturing motion

Motion: is a change in position with time.

The position changes in relation to objects that do not move.



Types of motion:

1. Linear motion
- 2-curved motion
- 3-circular motion

Motion in a straight line (linear motion):

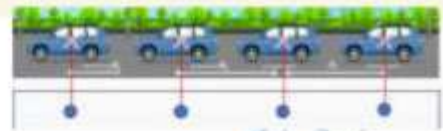
Identify two factors you must know to describe the motion of an object along a straight line

- 1.
- 2.

Motion diagram and particle model

Motion can be pictured using 2 diagrams :

1. **Motion diagram:** The separate images taken by a camera can be combined to show the position of the object at equal time intervals.
2. **Particle model :** turning the shapes into dots



This object is _____ (ثابت في مكانه)



This object is moving at a _____ (سرعة ثابتة)



This object is _____ (يتسارع)



This object is _____ (يتباطأ)



Motion diagram and particle model

Match the motion diagram with the correct motion expression



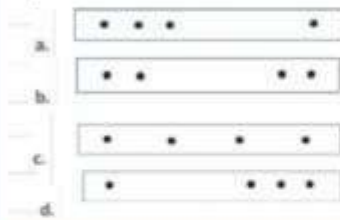
Slowing down

Speeding up

Constant speed

Standing still

which of the following particle model motion diagrams represent the motion of the flying bird in the figure



shown is the particle model for a car's motion , which of the following is a correct description of the car's motion ?

- The car moves in a constant speed
- The car is speeding up
- The car is slowing down
- The car was speeding up and then started to slow down



Car Motion Diagram Draw a particle motion diagram corresponding to the motion in Figure 4 for a car coming to a stop at a stop sign. What point on the car did you use to represent the car?



Section 2.2 where and when

Coordinate system

- Coordinate system** : a system used to describe the location of objects relative to a reference point (origin)
- origin** : is the point at which all variables in a coordinate system have the value zero. (النقطة التي بنقيس منها المسافات والاتجاهات)

One dimensional coordinate system (1D) : used to describe the location of objects moving in a straight line.



Draw the following family in their right position:

- Mama is 5 meters away to the left of the house
- Baba is 4.5 meters to the right of the house
- Baby is at the house
- Where is the tree?
- Where is the light pole?



Position the distance and direction from the origin to the object.

- Can be represented by drawing an arrow from the origin to the point that represents the runner



Distance

is the entire length of an object's path, even if the object moves in many directions. طول المسار الكامل الذي قطعه الجسم.

What is the total distance travelled by the daydreaming pathetic man?



Distance

What is the total distance travelled by the daydreaming pathetic man?



Search in page 34 and complete the flow chart:

Quantities in physics

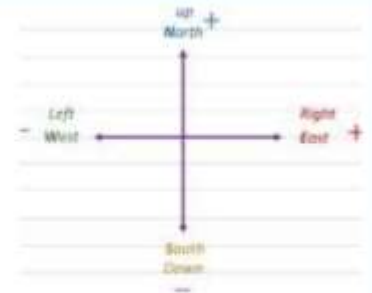
Scalars

Vectors

- You can represent a vector quantity with an _____.
- The length of the arrow represents the _____ of the vector quantity, and the direction of the arrow represents the _____.
- we will use _____ letters to represent vector quantities



What is the **initial** position of the man?
 What is the **final** position of the man?
 What is the distance traveled by the man?



Vectors and scalars addition and subtraction of 1D vectors

Mathematically :

Add normally , but pay attention to the directions and signs

Graphically :

1. Align vectors tail to head.
2. the resultant will be from the tail of the first vector to the head of the last vector.

P.S : If any of the vectors have a negative sign before it , flip it and then align the vectors tail to head

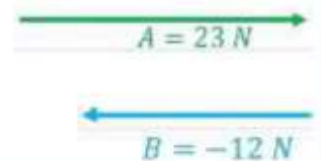


NOTE:

The result of the addition or subtraction of vectors is called the **Resultant**

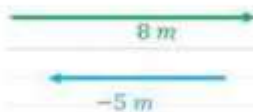
If vector $A = 23\text{ N}$ and vector $B = -12\text{ N}$ find the following :

- $R = A - B =$
- $R = A + B$
- $R = B - A$



in the figure there are two vectors. The first vector magnitude is (8m) directed east. And the second vector magnitude is 5 m directed west. What is the sum of the two vectors ?

- ☐ 3 m east ☐ 3 m west ☐ 8 m east ☐ 8 m west



Displacement it is a vector quantity that describes the change in position of an object.

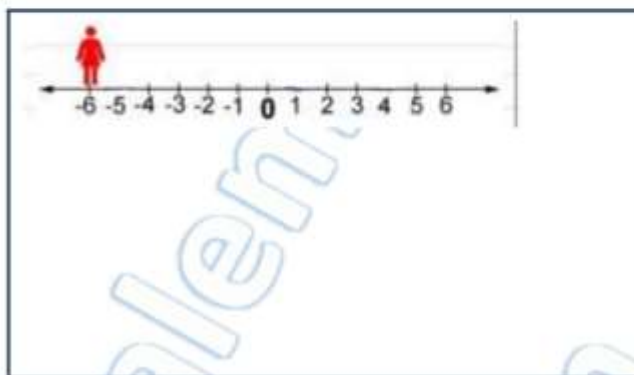
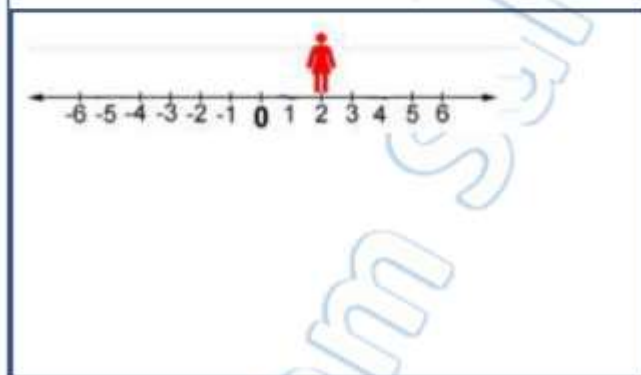
$$\Delta x = x_f - x_i$$

x_f : final position (الموقع النهائي)

x_i : initial position (الموقع الابتدائي)

represented with an arrow from the initial to the final position

What is the displacement of the girl for the following situations



- What is the initial position of the man?
- What is the final position of the man?
- What is the distance traveled by the man?
- What is the displacement of the man?



Time interval

time interval (Δt) (s): The time it takes to go from one position to another.

$$\Delta t = t_f - t_i$$

t_f : time of reach to final position (زمن الوصول للموقع النهائي)

t_i : time of reach to initial position (زمن الوصول للموقع الابتدائي)

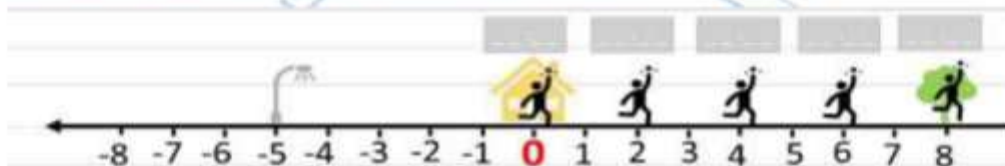
- How much time did sara take to reach the house?
- How much time did sara take to reach the tree?
- How much time did sara take to cross the distance between the house and the tree?



Exercise

Ahmad went from his house to the tree, the time interval between each two adjacent pictures is 2 s

1. What is ahmad's initial position ?
2. What is ahmad's final position?
3. What is the distance traveled by ahmad?
4. What is ahmad's displacement?
5. How much time did ahmad take to reach the tree?
6. What is ahmad's displacement after 6 seconds of his motion?



depending on the movement of the toy car in the figure, what is the car's displacement after 0.30s from the beginning of It's motion.

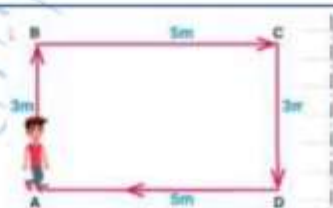
The time interval between adjacent pictures is 0.15s

- ☐ +70 m
- ☐ +50 m
- ☐ +80 m
- ☐ +40 m



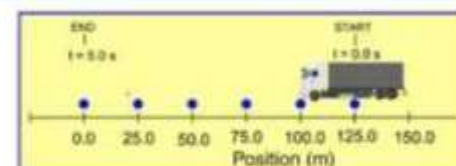
adam started moving from point A, he passed the points B,C,D as shown in the figure before he came ack to point A. what is the displacement and distance respectively?

- ☐ 0m and 16 m
- ☐ 16 m and 16 m
- ☐ 0 m and 34 m
- ☐ 34 m and 34 m



a truck is at a position of $x = 125 \text{ m}$ and moves toward the origin $x = 0 \text{ m}$, as shown in the motion diagram below

1. What is the truck's displacement?
2. How much time did it take the truck to reach the origin ?



Exercise

a driver rides his bike a distance of 50 m towards the north from the origin, then turns back and drives 70m towards the south. What is the driver's total displacement ?

- ☐ 20 m south
- ☐ 20 m north
- ☐ 120 m south
- ☐ 120 m north

a driver rides his bike a distance of 30 m towards the east from the origin, then turns back and drives 80m towards the west. What is the driver's total displacement ?

- ☐ 50 m east
- ☐ 50 m west
- ☐ 110 m east
- ☐ 110 m west

a driver rides his bike a distance of 20 m towards the east from the origin, then travels another 15 m towards the east. What is the driver's total displacement ?

- ☐ 35 m east
- ☐ 35 m west
- ☐ 5 m east
- ☐ 5 m west

an elevator was in the ground floor (zero floor) it travels down 3 floors, then travels 8 floors upwards , what is the elevator's:

- Initial position
- Final position
- **Displacement**

which one of these physical quantities is a vector quantity?

- ☐ Speed
- ☐ displacement
- ☐ Time
- ☐ Area

if the Emirati hope probe orbited mars one full cycle, what is the probe's distance traveled and displacement?

- ☐ Distance is circumference of the circular orbit while the displacement is zero
- ☐ Distance and displacement both are zero
- ☐ Distance is zero while the displacement is circumference of the circular orbit
- ☐ Distance and displacement both are equal to circumference of the circular orbit

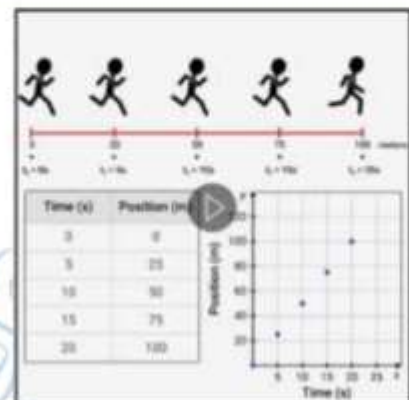
Section 2.3 position- time graphs

Finding positions

The same Motion can be represented in 5 ways :

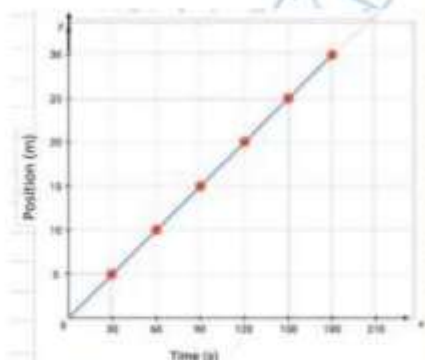
- motion diagram
- Particle model
- Time – position table
- Position – time graphs
- Equation

We can find the position of the object at any time using position – time graphs.

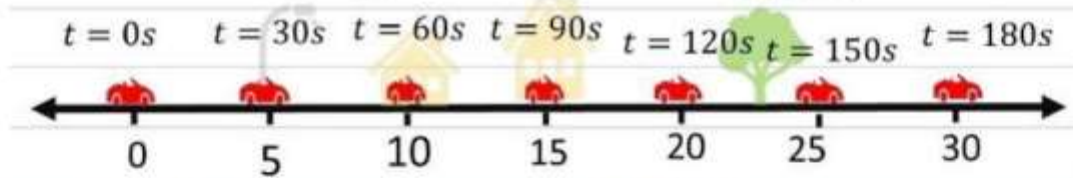


- what is the position at the following time instant.
 - $t = 30\text{ s}$
 - $t = 150\text{ s}$
 - $t = 180\text{ s}$
 - $t = 210\text{ s}$
- at what time did the object reach the following positions?
 - $x = 10\text{ m}$
 - $x = 20\text{ m}$
 - $x = 30\text{ m}$

في مخطط موقع-زمن :
• إذا كان الخط صاعداً يكون الجسم متحركاً لليمين وإلا فإنه متحركاً لليسار.

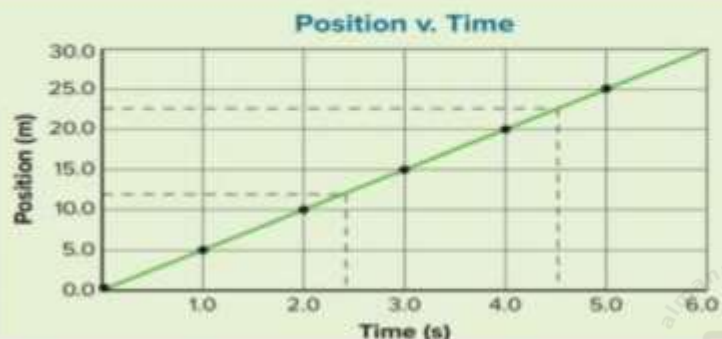


- In which direction is the car moving?
- What was the displacement of the car between $t = 30\text{ s}$ and $t = 150\text{ s}$?



EXAMPLE Problem 1

ANALYZE A POSITION-TIME GRAPH When did the runner whose motion is described in Figure 11 reach 12.0 m beyond the starting point? Where was she after 4.5 s?



في مخطط موقع-زمن : * إذا كان الخط نازلا يكون الجسم متحركا لليسار , وإزاحته سالبة

Finding positions

10. The graph in represents the motion of a car moving along a straight highway. Draw a particle model motion diagram that corresponds to the graph.

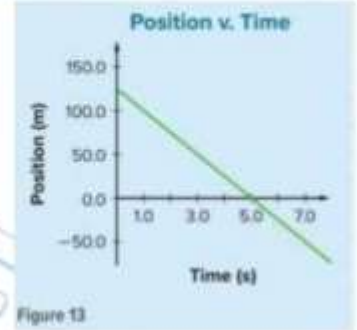
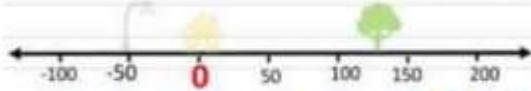
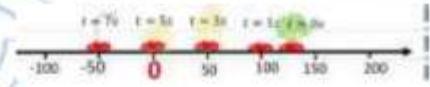


Figure 13



- In which direction is the car moving?
- At what time was the car's position 25.0 m east of the origin?
- Where was the car at time $t = 1.0$ s?
- What was the displacement of the car between times $t = 1.0$ s and $t = 3.0$ s?

- When did the car reach 150 Km from the origin?
- Where was the car after 20 minutes of its motion?
- Where was the car after 30 minutes of its motion?
- Where's the car after 40 minutes of its motion?
- At which time interval was the car standing still?



في مخطط موقع-زمن : * إذا كان الخط مستقيما يكون الجسم متوقفا , وإزاحته خلال هذه الفترة صفر

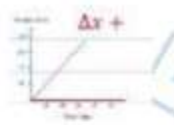
In a position- time graph:

1. The object is at rest if the line is straight and it's displacement Δx is zero



1. يكون الجسم متوقفا إذا كان الخط مستقيما وإزاحته Δx صفر

2. The object is moving to the right (or up) if the line is an incline and its displacement Δx is positive



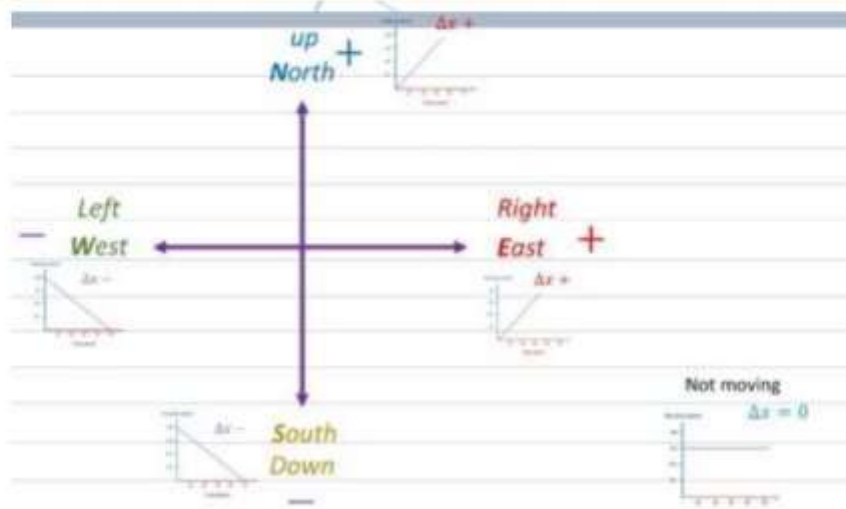
2. يكون الجسم متحركا لليمين (أو الأعلى) إذا كان الخط صاعدا وإزاحته Δx موجبة

3. The object is moving to the left (or down) if the line is a decline, and its displacement Δx is negative.



3. يكون الجسم متحركا لليسار (أو الأسفل) إذا كان الخط نازلا وإزاحته Δx سالبة

Finding positions



this position time graph is for a postman (مساعد بريدي) moving from house to house.

1. When did the postman reach 1 km from the origin ?
2. For how long was the postman at 1 km from the origin



A motion of a bus is represented in the graph below, at which time interval was the bus at rest?

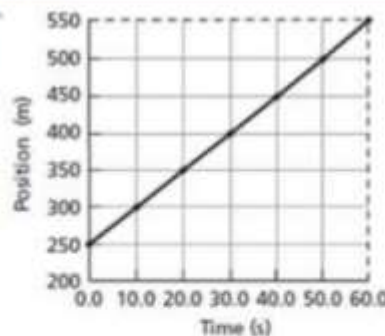
In which direction was the bus moving during the first 5 seconds of it's motion?



The position time graph below shows a cyclist's location in 60 s time interval.

What is the cyclist's displacement from the starting position after 40s ?

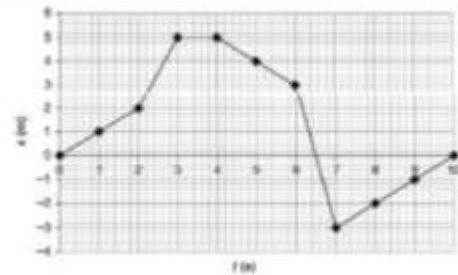
- ☐ 200 m
☐ 400 m
☐ 450 m
☐ 250 m



Finding positions

Ministry: the graph below represents the position-time graph for a deer walking in the zoo.
during which time is the deer at rest?

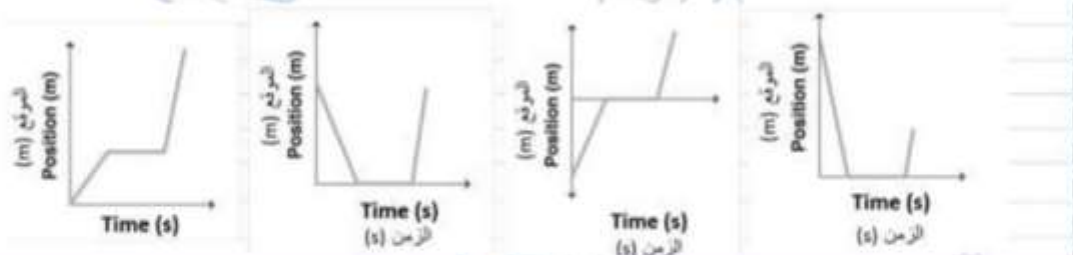
- ☐ 3-4 s
☐ 3-6 s
☐ 6-7 s
☐ 0-2 s



- Where was the object at $t = 40$ seconds ?
- When was the object at 20 m from the origin?
- In which time interval was the object standing still ?
- In which time intervals was the object moving to the right?
- In which time interval was the object moving to the left ?
- At which time interval was the object to the right of the origin ?
- at which time interval was the object to the left of the origin ?
- What is the displacement of the object during the first 15 seconds of its motion?
- What is the displacement of the object between 15 and 40 seconds ?
- What is the total displacement of the object?
- What is the total distance traveled by the object?



- A cat took 15 s to go down a fence, whose height is 2.5 m, with a constant speed
- The cat stopped on the ground for 25 s
- Then suddenly jumped in 2 s up a box which Height is 1.25 m with a constant speed.
- The diagram that represents the cats motion is:

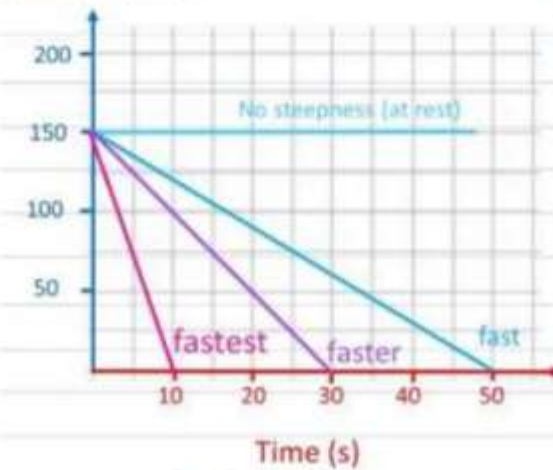


كل ما زاد ميل الخط في مخطط موقع- زمن كل ما زادت سرعة الجسم

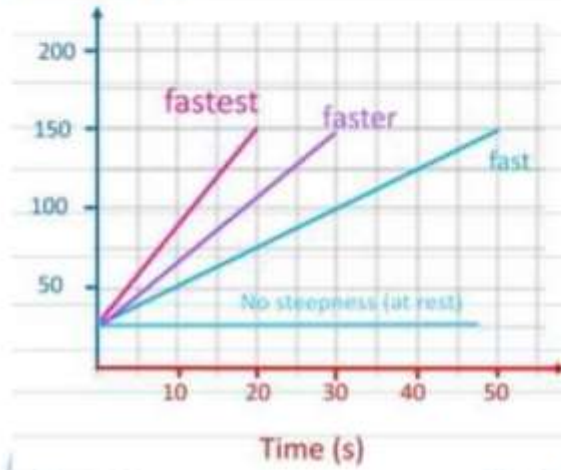
Steepness of the line

The **steeper** the line in the position –time graph, **the faster** the object.

Position (km)

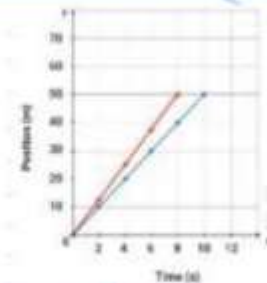


Position (km)



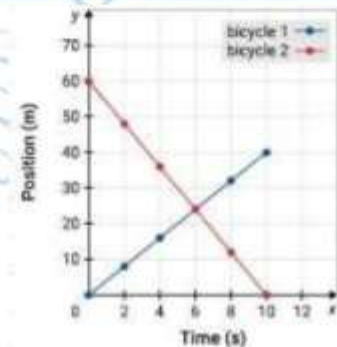
Imagine that two runners are running along a racetrack. Which runner was faster?

After 6 seconds of motion, what is runner 1 and runner 2's instantaneous positions?



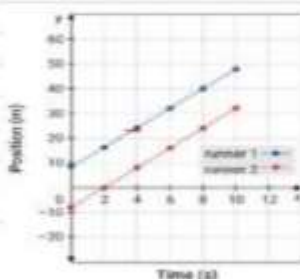
If the lines cross, the objects **meet at that point in time**

Question: Where and when do the two bikers cross paths ?



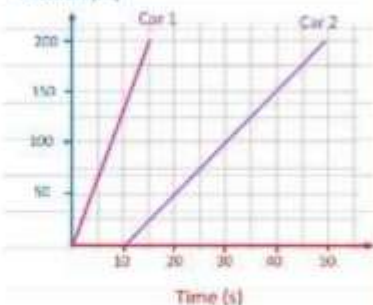
do you think the runner's paths will cross?

runner 1 starts with 100m



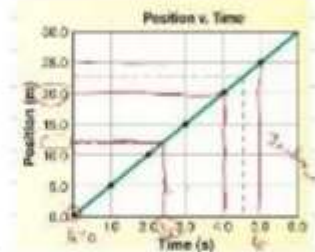
- When did car 1 start moving ?
- When did car 2 start moving?
- Will the two cars cross paths?
- At what time was car1 200 m to the right of the origin?
- At what time was car2 200 m to the right of the origin?
- Which car is faster?

Position (m)



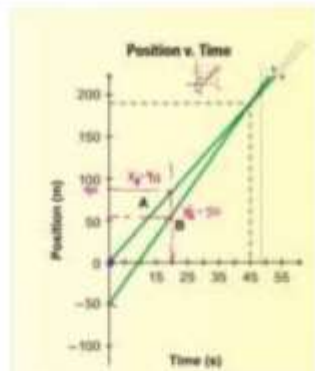
Steepness of the line

1. Initial position:
2. Final position :
3. the displacement he covered in the first 3 seconds ?
4. How much time did the runner take to get from the initial to the final position ?
5. Where was the runner after 4.5 s ?
6. When did he reach 20 m from the starting point?



For problems 16–19, refer to the figure in Example 2 on the previous page.

16. Where was runner A located at $t = 0$ s?
17. Which runner was ahead at $t = 48.0$ s?
18. When runner A was at 0.0 m, where was runner B?
19. How far apart were runners A and B at $t = 20.0$ s?

**Section 2.4 how fast**Velocity and speed

Average velocity السرعة المتجهة المتوسطة	Average speed السرعة القياسية المتوسطة	Instantaneous velocity (velocity) السرعة المتجهة اللحظية
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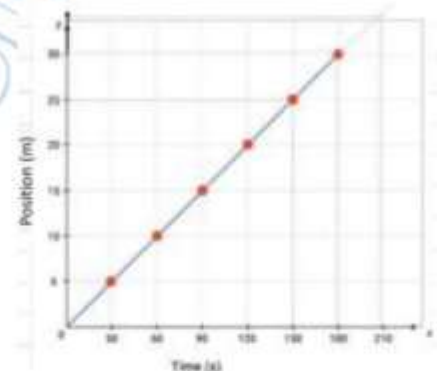
Average velocity ($\vec{v}$)(m/s) vector

Average velocity: is the ratio of an object's **change in position (displacement)** to the **time interval** during which the change occurred.

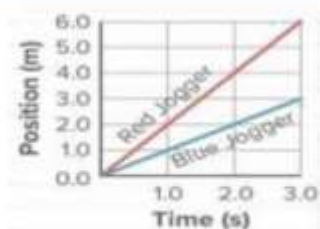
If the object is in **uniform motion**, so that its **speed does not change**, then its average velocity is the **slope** of its **position-time graph**.

$$\vec{v} = \frac{\Delta x}{\Delta t} \quad \vec{v} = \frac{(x_f - x_i)}{(t_f - t_i)}$$

The **average velocity** and **displacement** of a moving object are always in the **same direction**



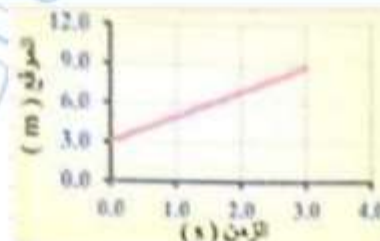
What is the red and blue runners average velocities during the three seconds of motion?



We found out that:

1. The slope of the line in a position- time graph **is the velocity**
2. The **steeper** is the slope, **the faster** is the object

Find the average velocity for the motion of the object whose position-time graph is shown below



Average velocity ($\bar{v}$)(m/s) vector

the figure below shows a simplified graph of a bicycle's motion. When is the bicycle's speed (velocity) greatest ?

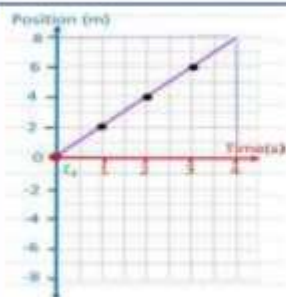
- ☐ Section III
- ☐ Section I
- ☐ Section II
- ☐ Section IV



a moving truck makes the displacement of 180 m towards the east in a period of 9.0 s . What is the average velocity of the truck?

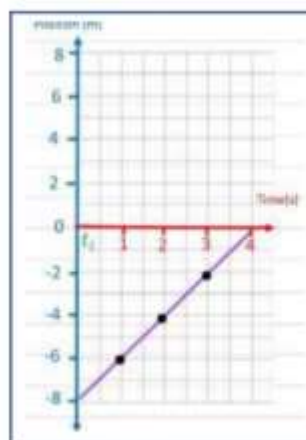
- ☐ 96 m/s east
- ☐ 12 m/s east
- ☐ 20 m/s east
- ☐ 40 m/s east

Average velocity: interpreting slope



1. In which direction is the object moving?
2. What is the total displacement?
3. What is the average velocity?

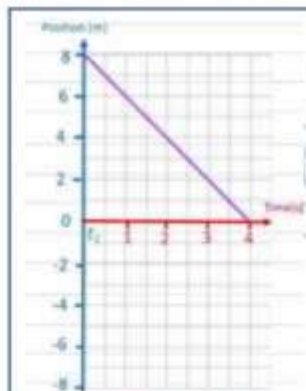




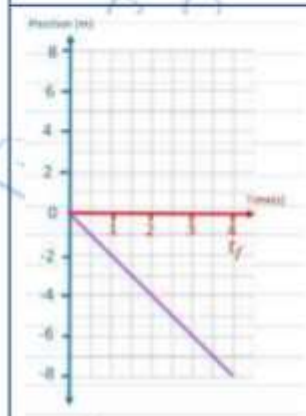
1. In which direction is the object moving?
2. What is the total displacement?
3. What is the average velocity?



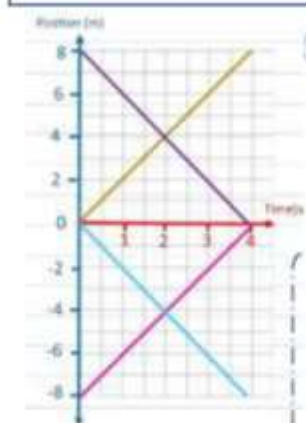
Average velocity: interpreting slope



1. In which direction is the object moving?
2. What is the total displacement?
3. What is the average velocity?



1. In which direction is the object moving?
2. What is the total displacement?
3. What is the average velocity?



- Object moving right (or up) , Δx and $\bar{v}$ positive
- Object moving right (or up) , Δx and $\bar{v}$ positive
- Object moving left (or down) , Δx and $\bar{v}$ negative
- Object moving left (or down) , Δx and $\bar{v}$ negative

Describe the motion of the car which position time graph is shown below

- The car started moving from a position of _____ km left of the origin towards the _____
- After _____ minutes, the car reached the origin
- The car kept moving to the _____
- After 50 minutes, the car reached a position of _____ km to the right of the origin
- The car was displaced by _____ km towards the right from its initial position
- And it was moving with a constant velocity of _____ km/min

