Abu Dhabi Secondary School

Physics Department

Grade 9 Advanced Physics EOT revision

Term 1

2025/2026

Prepared by: Adnan Alshakhatreh

Student name:

_____

Class/section

9/_____

Circle the correct answer:

1- The following is a statement that describes something that happens in nature and seems to be true in all cases.
a. Scientific Theory b. Scientific Law c. Hypothesis d. prototype

2. What is the basic unit of time?
a. second b. minute c. hour d. day

3- How many significant numbers are in the measurement **2.002m**?
a.2 b. 3 c.4 d.5

4. Which of the following prefixes is major?
a. Years b. Fill c. Desi d. Kilo

5- The _____ variable is the factor that is altered or manipulated. A dependent variable is a factor that depends on an independent variable.
a. Control b. Independent C. Hypothesis d. Theory

The table below shows three trials for measuring the height of a book done by four different students, if you know that the true length for the book (**30.3cm**), answer questions (6 and 7).

Student	Trial 1	Trial 2	Trial 3
Ahmed	29.0	31.1	33.9
Rashid	30.4	30.1	30.2
Saod	32.5	32.4	32.5
Salem	34.1	29.8	26.9

6. Which students had the most precise measurements?

a. Ahmed
b. Salem
c. Rashed
d. Saod

7. Which student has the most accurate measurements?

a. Ahmed
b. Salem
c. Rashed
d. Saod

The figure shows the movement of a toy car, depending on the figure answer questions (8 and 9).

8. What is this diagram called?

a. All Photos
b. Consecutive Images
c. Magnifying Model
d. Particle Model

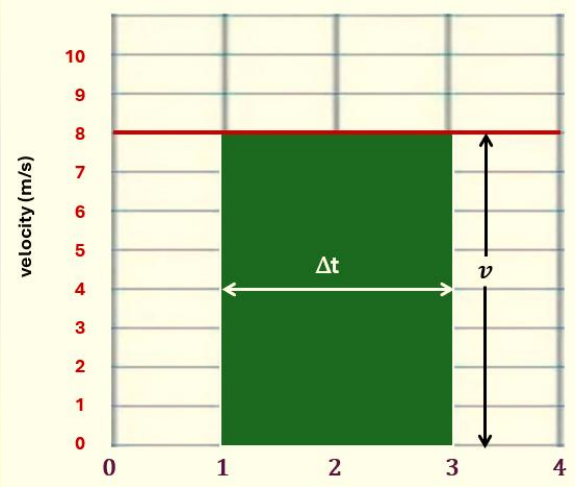
9. Which is the following correct description of the movement of a toy car?

a. Its speed is increasing
b. Its speed is decreasing
c. Its speed is constant
d. Do not move

10- According to the relationship ($\frac{x}{y} = constant$) If x and y are plotted in a graph, the graph will be:

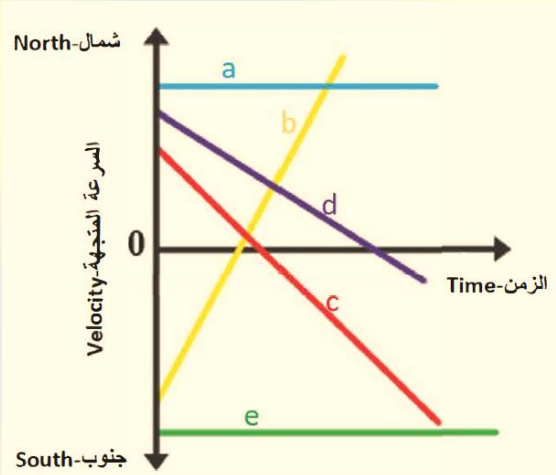
a. Straight lines.
b. curved line
c. positive line
d. circle

11. What does the area of the rectangle represent in the adjacent curve?



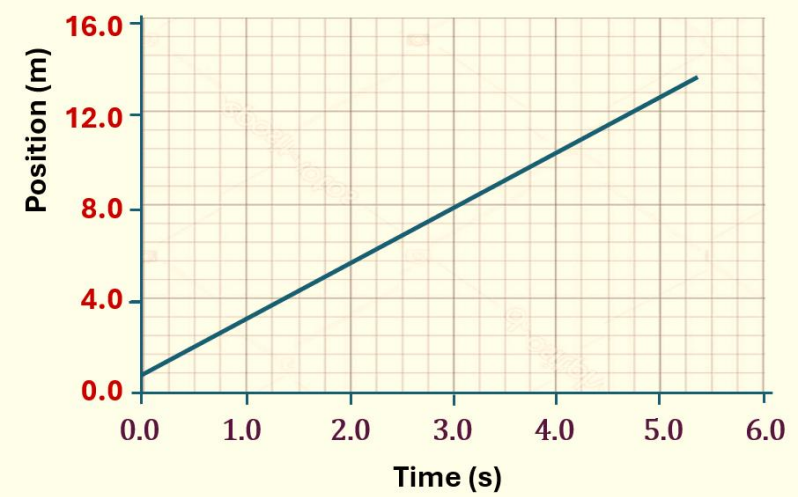
a. Time
b. Displacement
c. Speed
d. Acceleration

12- In the graph below, which line represents an object in motion where its acceleration is **zero** and its velocity is **negative**?



a
b
c
d
e

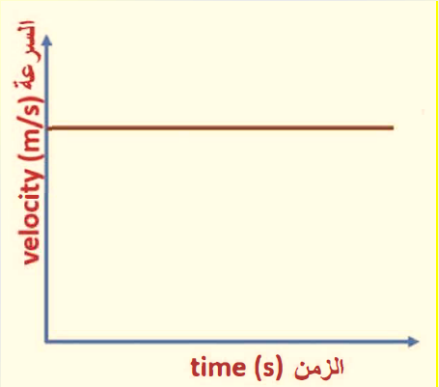
Depending on the position-time graph, for an insect moving east, answer questions (13 and 14).



13. What time did the insect reach a distance of **8.0 m** starting from the starting point?
a. 6.0s b. 5.0s c. 3.0s d. 1.0s

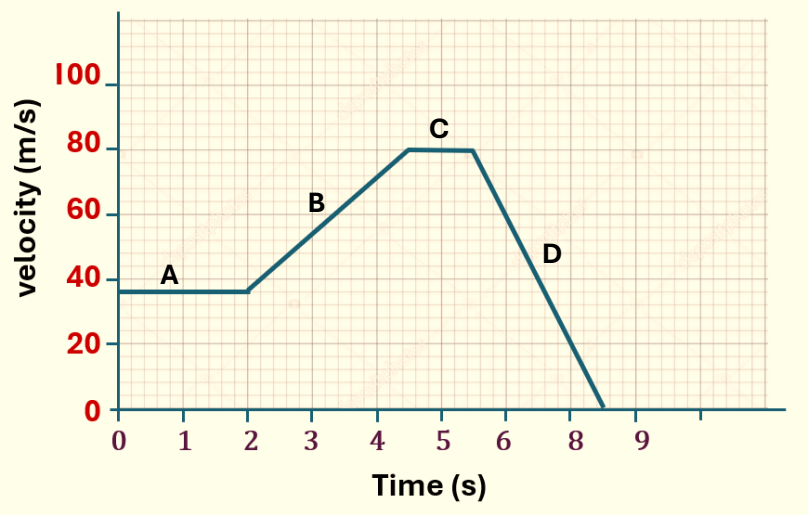
14. What does the slope of the line represent?
a. Accelerated b. speed c. time d. Displacement

15- Based on the velocity-time graph of a car moving in a straight line, which of the following is correct?



A. The car's velocity is increasing uniformly.
B. The car's acceleration is negative.
C. The car's acceleration is positive.
D. The car is moving at constant velocity.

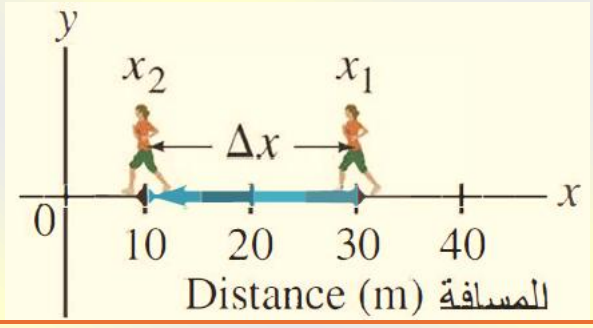
The adjacent figure represents the velocity-time graph, so that it describes the movement of Mohammad heading towards the club.



Answer paragraphs (16 and 17).

16. During which time periods (A, B, C, D) is Mohammad's acceleration positive?
A B C D

17- During which time periods (A, B, C, D) is the acceleration of Mohammad zero?
A and C B and C D and C A and B

18- Sara starts at X_1 = 30 m and walks to the left to the point X_2 = 10 m. What is Sara's displacement?

A. 40m B. 20m C. -20m D. -10m

19- A bus starts at rest and accelerates at **4.5 m/s²** after a traffic light turns green. How far will it have gone when it is traveling at **30 m/s**?

A. 6.7m
B. 200m
C. 100m
D. 80m

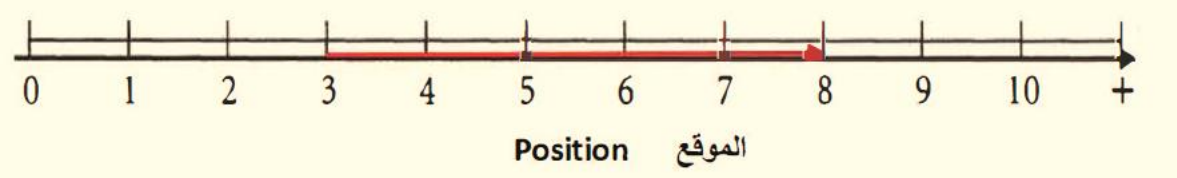
20- A horse slows from **36 m/s** to **15 m/s** over **3.0 s**. What is its average acceleration?

A. 21 m/s^2
B. 7 m/s^2
C. -7 m/s^2
D. -21 m/s^2

21- What is the area of a square sheet of paper with a dimension of **3.6 cm** by **3.6 cm** considering the correct number of significant figures?

A. 12 .9 cm^2
B. 12.96 cm^2
C. 13.0 cm^2
D. 13 cm^2

22- In the graph, a toy car rolls from position **+3 m** to **+8 m**. Which of the following statements is true?

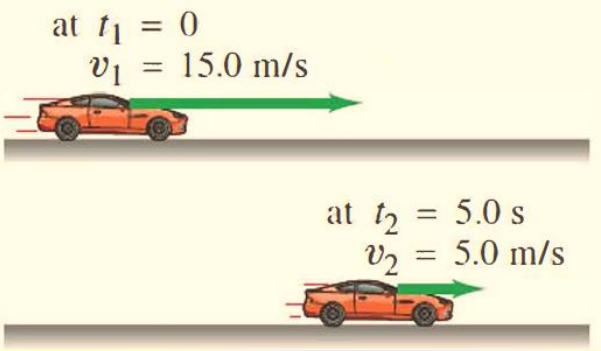


A. $\Delta x = +3m$
B. $x_i = +3m$
C. $x_f = +3m$
D. $v_{avg} = 3m/s$

23- How far can a cyclist travel in **2.5 h** along a straight road if his average velocity is **18 km/h**?

A. 0.14 km
B. 7.2km
C. 20.5 km
D. 45 km

24- Using the motion diagram of a racing car, what is the average acceleration of the car?



A. -3 m/s^2
B. -2 mls^2
C. 4 m/s^2
D. -4 m/s^2

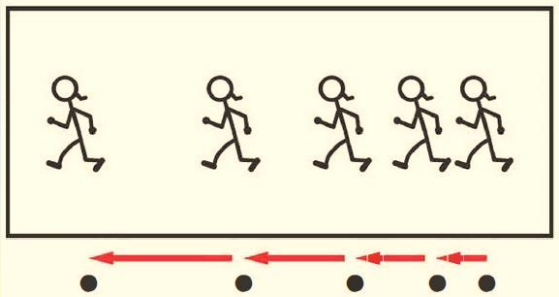
25- A car is initially at rest. If it accelerates uniformly at **2 m/s^2** for **4 seconds**, what is its final velocity?

A. 16 m/s
B. 2 m/s
C. 8 m/s
D. 4 m/s

26- Which of the following is **NOT** an example of accelerated motion?

A. A boulder falling off a cliff in a straight path.
B. A cyclist moving in a straight line at a constant speed.
C. An airplane taking off on a straight runway.
D. A ball being thrown straight up.

27- Which statement correctly describes the motion of the girl in the motion diagram below?

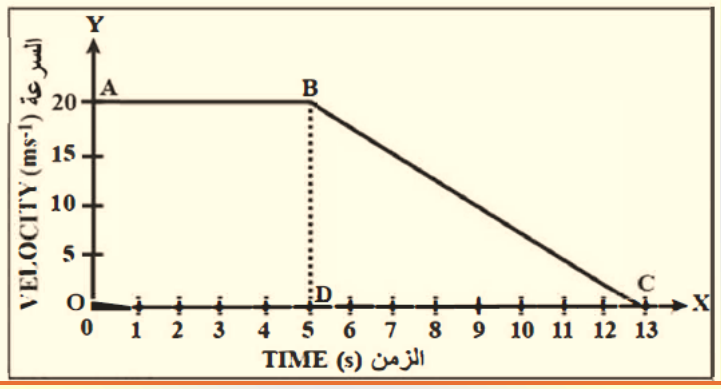


A. The girl is slowing down in the positive direction.
B. The girl is speeding up in the positive direction.
C. The girl is speeding up in the negative direction.
D. The girl is slowing down in the negative direction.

28- Which statement about drawing vectors is true?

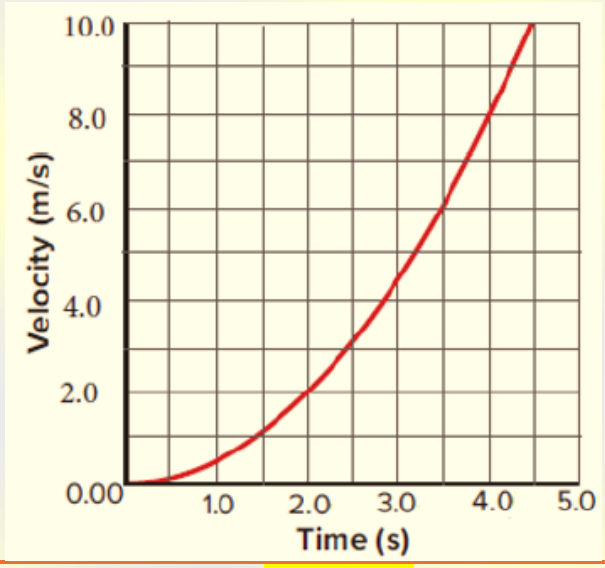
A. All quantities in physics are vectors.
B. You need a vector diagram to solve all physics problems properly.
C. A vector is a quantity that has a magnitude but no direction.
D. The vector's length should be proportional to its magnitude.

29- A bus is moving along a straight line and its velocity-time graph is shown below. What is the total distance travelled by bus during the first **5 seconds** of motion?



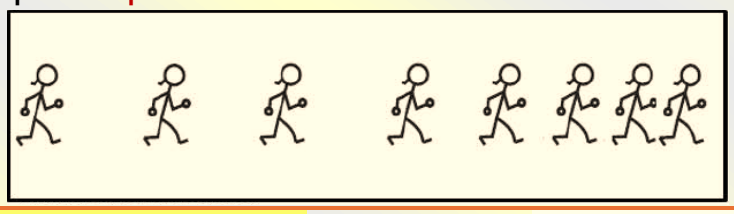
A. 260m
B. 1.5 m
C. 100m
D. 180m

30- The figure shows the velocity-time graph of a car's motion. At what time the instantaneous velocity of the car was **6.0 m/s**?

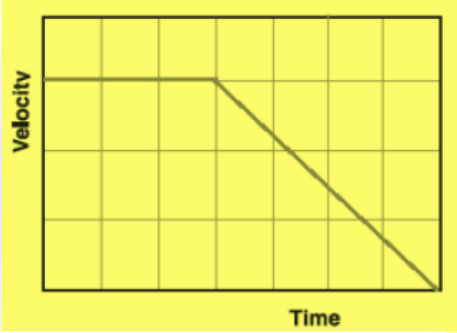


A. t = 3. 5 s
B. t = 3. 0 s
C. t = 4. 0 s
D. t = 2. 5 s

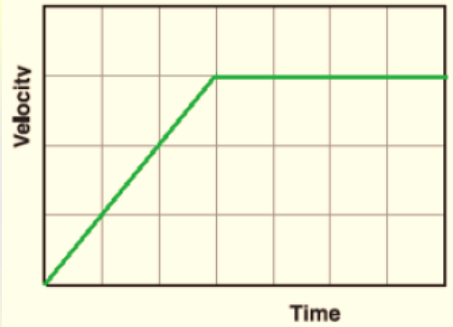
31- The figure represents the motion diagram of a runner. Which of the following graphs represents the runner's motion?



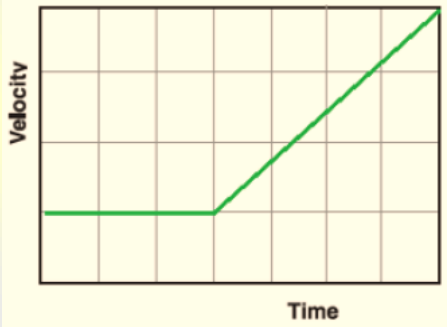
A.



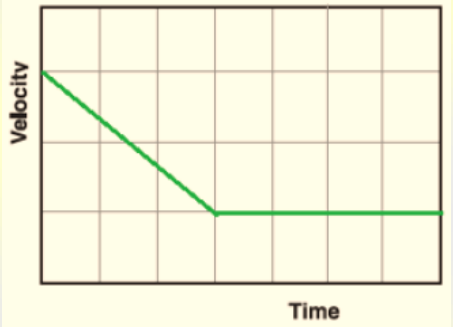
B.



C.



D.



32- Four groups of students A, B, C and D measured the mass of a golf ball, each in three trials, and recorded their measurements in the table below. The correct mass measurement of the ball is **40.0g**. Which group's measurements are both accurate and precise?

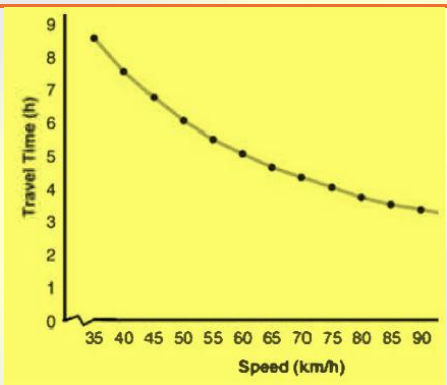
	Trial 1	Trial 2	Trial 3
A	36.6 g	36.3 g	36.5 g
B	35.8 g	40.0 g	38.7 g
C	39.8 g	40.1 g	39.7 g
D	41.1 g	40.9 g	41.2 g

33- How many significant figures are in the number **0.00160**?

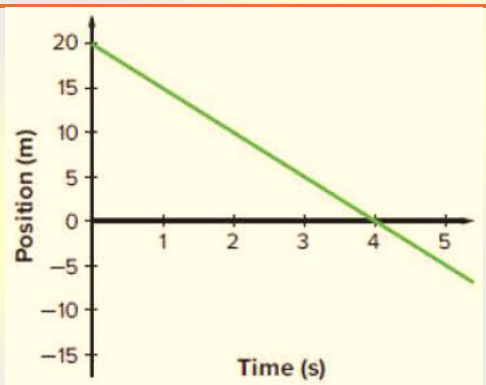
A. 3
B. 4
C. 2
D. 5

34- Which of the following graphs represents an inverse relationship?

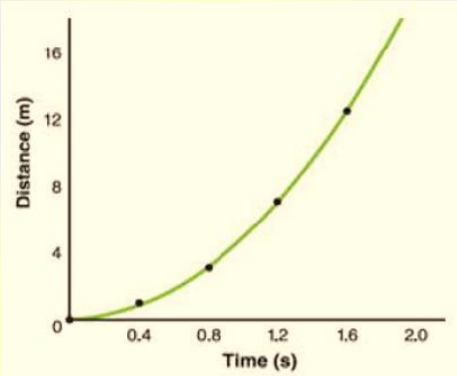
A.



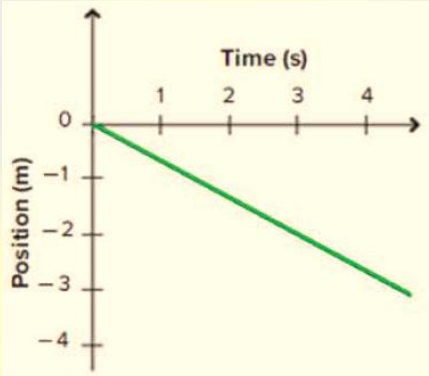
B.



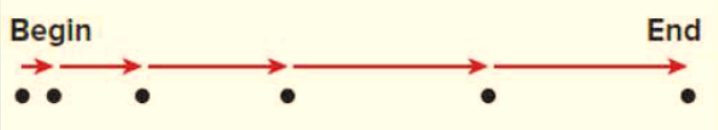
C.



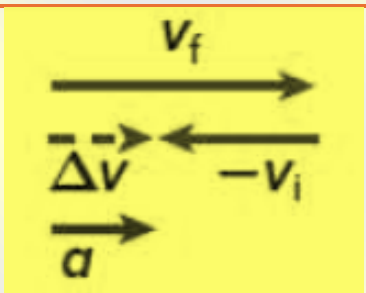
D.



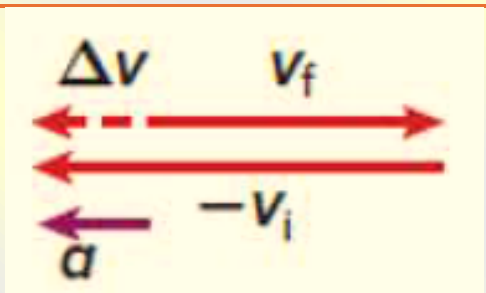
35- Which of the following vector representations is corresponding to a speeding up object?



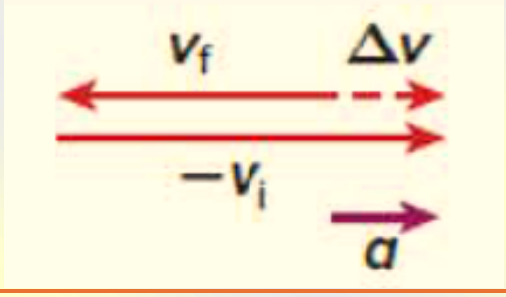
A.



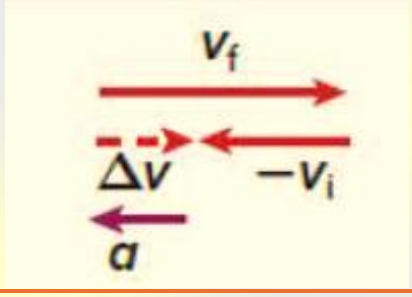
B.



C.



D.



36- Which of the following is a scalar quantity?

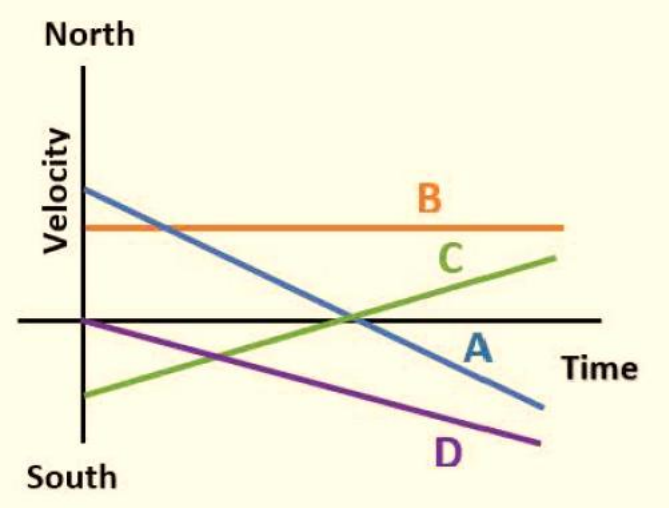
A. Velocity
B. Displacement
C. Acceleration
D. Distance

37- The table below describes the velocity of four objects A, B, C and D in terms of its magnitude and direction. Which of the objects is accelerating?

	مقدار السرعة Velocity magnitude	اتجاه السرعة Velocity direction
A	Constant ثابت	Constant ثابت
B	Changing متغير	Constant ثابت
C	Constant ثابت	Changing متغير
D	Changing متغير	Changing متغير

A. B, C and D only
B. A and C only
C. Band D only
D. All the objects

38- The graph shows the motions of four runners A, B, C and D. Which runner starts with an initial velocity towards the north, slows down, for an instant has zero velocity, and then moves south with increasing speed?



A
B
C
D

39- Which of the following numbers is equal to **72.5 cm**?

A. 0.725 mm
B. 725 dm
C. 01 .725 m
D. 7.25×10^{-4} km

40- The table represents the position of a car at various times. In which time interval was the runner moving in a constant speed?

Time (s)	Position (m)
0.0	0.0
1.0	5.0
2.0	10.0
3.0	20.0
4.0	30.0
5.0	35.0

A. t = 2.0s ➔ t = 4.0s
B. t = 1.0s ➔ t = 4.0s
C. t = 0.0s ➔ t = 3.0s
D. t = 2.0s ➔ t = 5.0s

41- An ant moves a distance of **240 *cm*** in **1 *minute***. What is the speed of the ant in **m/s**?

A. 4.0
B. 0.25
C. 25
D. 0.04

42- A truck moves to the east on a straight road. It moves with an average velocity of **60 *km/h*** for **1. 5 *h***, then continues in the same direction with an average velocity of **100 *km/h*** for **2h**. What is the position (displacement) of the truck at the end of the trip?

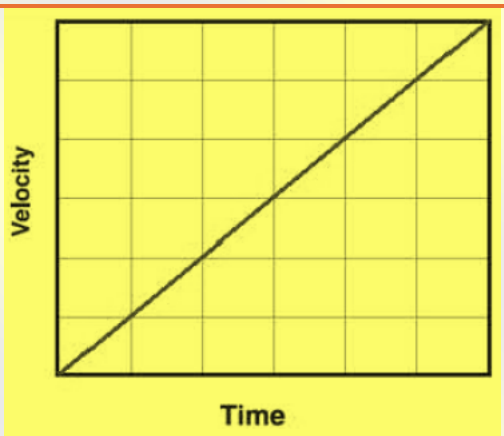
A. 290 km East
B. 110 km East
C. 160 km East
D. 90 km East

43- Which of the following physical quantities represents a scalar?

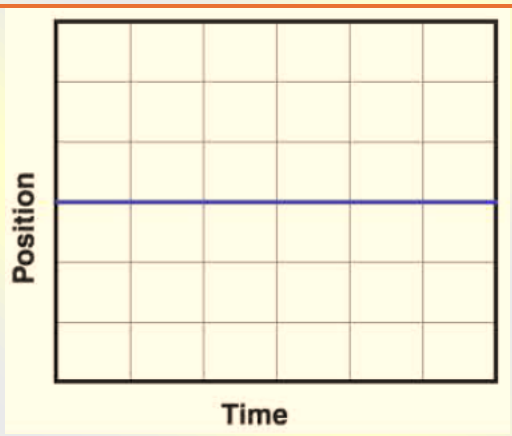
A. Time
B. Force
C. Acceleration
D. Displacement

44- Which of the following graphs represents an object moving in a non-uniform motion?

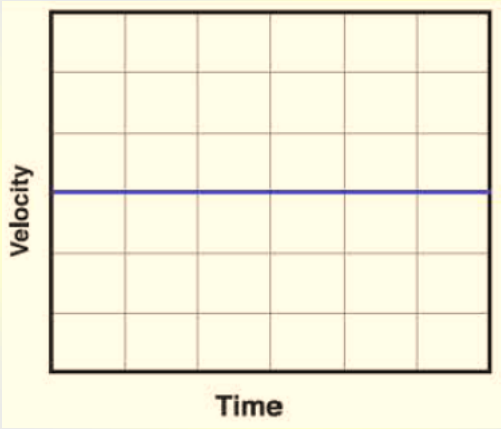
A.



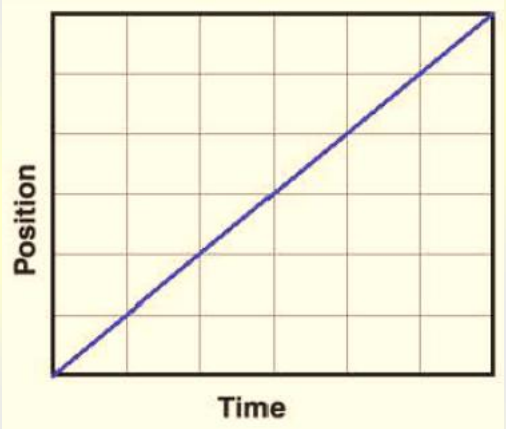
B.



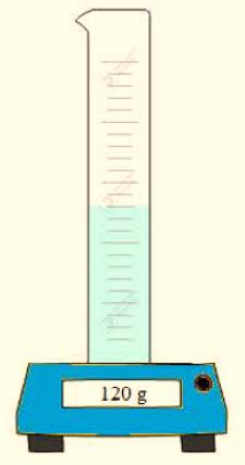
C.



D.



45- Sara is conducting an experiment to determine the density of a liquid. She fills a measuring cylinder several times with a different volume of the liquid and measures the mass of the liquid each time. Sara then, plots the volume on the x-axis and the mass on the y-axis, draws the best fit line and finds the slope which equals the density of the liquid. Which of the following is the independent variable in Sara's experiment?



A. The mass of the liquid

B. The density of the liquid

C. The slope of the line

D. The volume of the liquid

46- A school bus accelerates from rest at **1.5 m/s^2**. How much time does the bus take to increase its velocity to **6.0m/s**?

A. 9.0s

B. 0.25s

C. 4.0s

D. 2.0 s

47- Which of the following terms represent steps that scientists take to investigate or solve a particular problem?

A. Scientific law
B. Hypothesis
C. Theory
D. Scientific methods

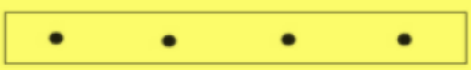
48- What is the average velocity of a truck traveling along a straight path if it displaced **(180m)** towards east over a time of **(9.0s)**?

A. (20 m/s) East
B. (12 m/s) East
C. (96 m/s) East
D. (40 m/s) East

49- Which of the following particle model motion diagrams represent the motion of flying bird in the figure?

A.

B.

C. 

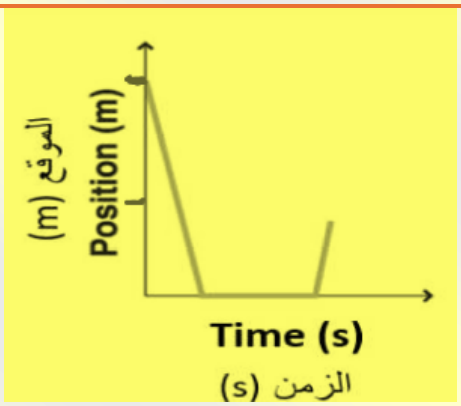
D.

50- Ahmed runs towards the football field at speed ($v_i = 4.50m/s$). When he looked at his watch, he noticed that it had extra time before the match start, he slowed down his speed over of **10.0s**, to reach a final speed of ($v_f = 0.95m/s$). What is the magnitude of the average acceleration during the **(10.0s)**?

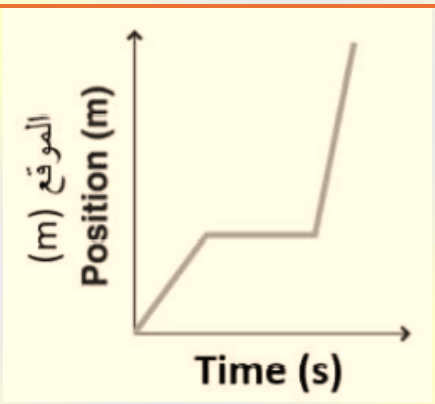
A. 0.712 m/s^2
B. 35.5 m/s^2
C. 1.80 m/s^2
D. 0.355 m/s^2

51- A cat descended from the top of a **2.5-m** wall at a constant speed in **15s** and remained on the ground motionless for a period of **25s**. then jumped up to a box with a height **(1.25m)** within **2s**. Suppose all speeds are constant. Which of the following graphs represents the movement of the cat?

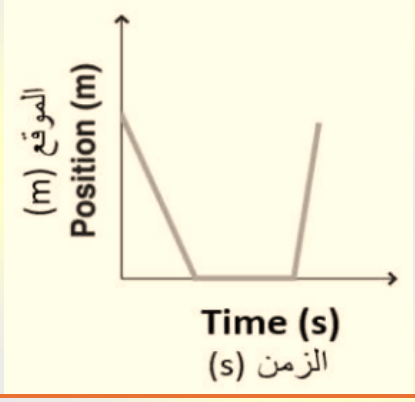
A.



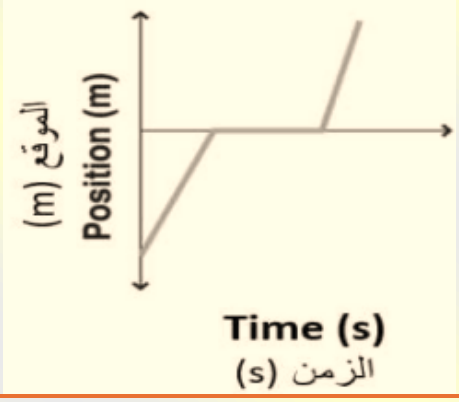
B.



C.



D.



52- A car moves from the starting point to the right at a variable speed and in a straight line until it reaches the finish point, as shown in the figure. Which of the following statements is true for the movement of the car?

A. Velocity and acceleration remain constant in magnitude, and both are directed to the right
B. Speed decreases and acceleration is directed to the right
C. Speed decreases and acceleration is directed to the left
D. Speed increases and acceleration is directed to the left

53- Based on the equation: [y = (3.0 m/s) + (X x 2.0 s)]
What is the physical quantity represented by the symbol X, and what is its unit of measurement in (SI–units)?

A. Length (m)
B. Time (s)
C. Velocity (m/s)
D. Acceleration (m/s^2)

54- How many significant figures are in the measurement **(10.005m)**?

A. 5
B. 3
C. 2
D. 4

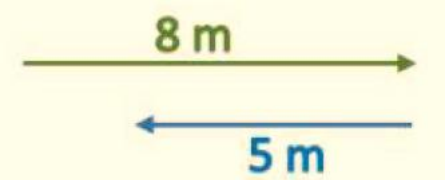
55- What is the basic (SI-unit) of temperature?

A. Kelvin
B. Joule
C. Celsius
D. Fahrenheit

56- The arrows in the image represent three measurements taken by a scientist during an experiment. Depending on the following picture, which of the following statements is correct regarding accuracy and accuracy?

A. Measurements are accurate but not precise
B. Measurements are precise and accurate
C. Measurements are not precise and not accurate
D. Measurements are precise but not accurate

57- The shape represents two vectors, the first is **(8m)** long towards east and the second is long **(5m)** towards west.
What is the sum of the two vectors?

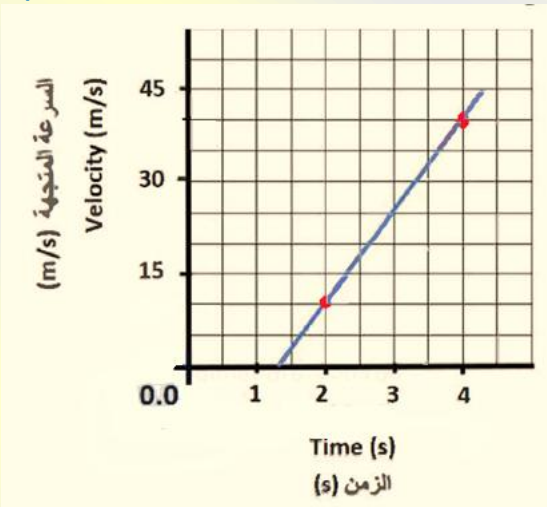


A. (3 m) East
B. (13 m) West
C. (3 m) West
D. (13 m) East

58- For a moving object that changes its position over time, the final position minus the initial position is .....

A. Acceleration
B. Velocity
C. Displacement
D. Time interval

59- The figure shows the velocity-time graph of a moving object. What is the average acceleration of the object during the time interval between **(t=2.0s)** and *(t=4.0s)*?



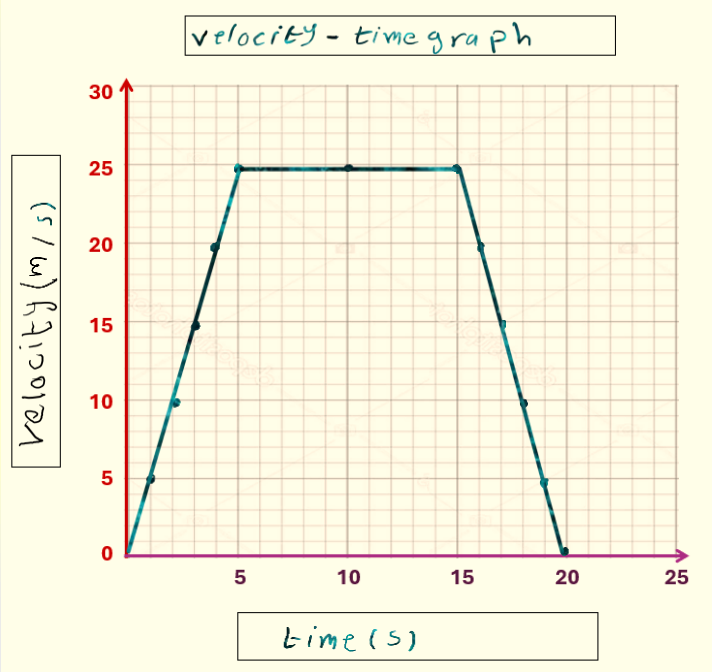
A. (+5.0) m/s^2
B. (+15) m/s^2
C. (+11) m/s^2
D. (0.0) m/s^2

Writing part

Q1: A car accelerates from rest at **5 m/s^2** for **5 seconds**. It moves with a constant velocity for **10s** and then slows down at **5 m/s^2** to come to rest again. The entire journey takes **20 seconds**.

Plot the velocity-time graph of the motion considering the following:

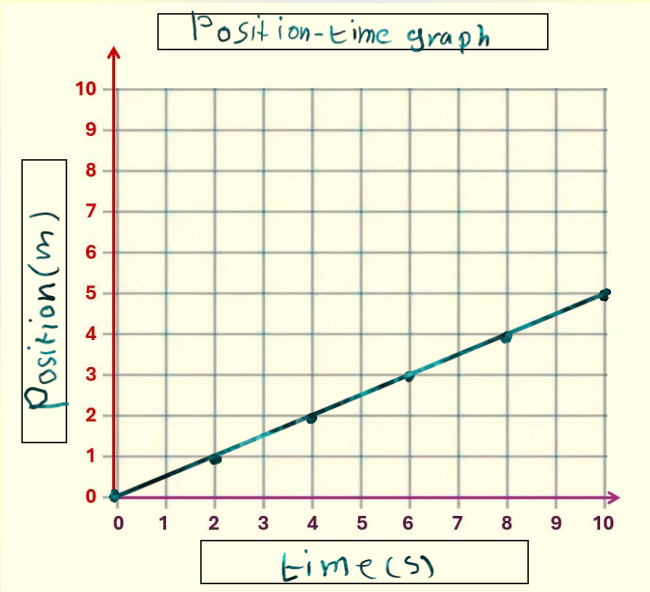
1. Write the graph title.
2. Label both the horizontal and vertical axis.
3. Draw the best-fit straight line or curve of the motion.



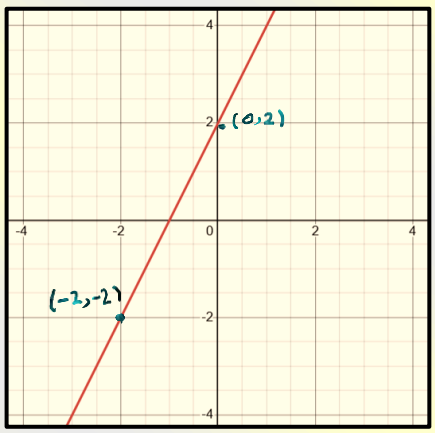
Q2: The given table shows the positions of a cat in different times.
Plot the position versus time graph of the cat's motion considering the following:

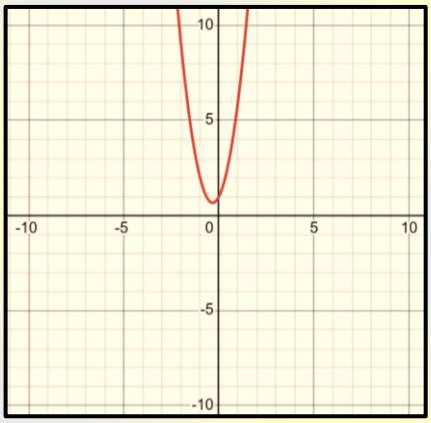
1. Write the graph title
2. Label both the horizontal and vertical axis
3. Draw the best-fit straight line or the curve for the motion

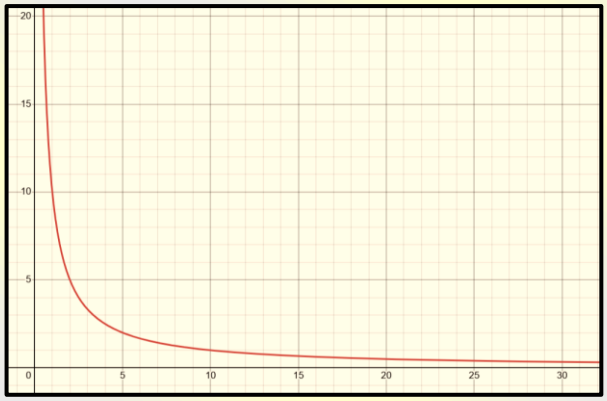
Time (s)	Position (m)
0.0	0.0
2.0	1.0
4.0	2.0
6.0	3.0
8.0	4.0
10.0	5.0



Q3: a. Match the graph with the correct mathematical relationship below:







$y = 3x^2 + 2x + 1$

$y = \frac{10}{x}$

$y = 2x + 2$

b. Find the slope of the line in the first graph.

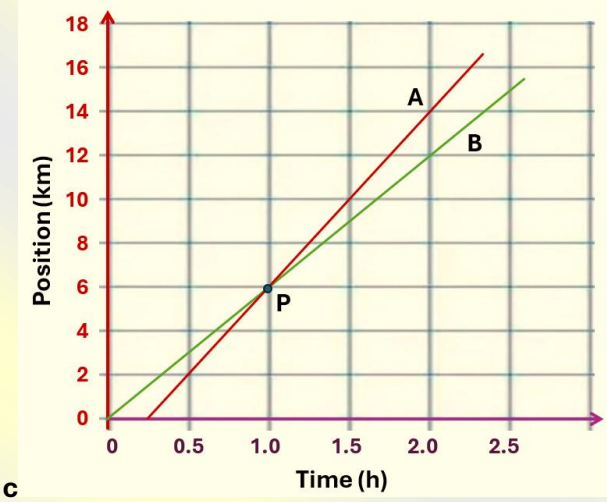
slope $= \frac{2 - {}^{-}2}{0 - {}^{-}2} = \frac{4}{2} = 2$ m/s

Q4: In a lab experiment, to determine the relationship between the elongation of a spring and the attached mass, what is the independent variable and the dependent variable?

A. Independent Variable: mass

B. Dependent Variable: elongation.

Q5: The graph represents the motion of two runners, (A) and (B).



c

a. How long had runner B already been running when runner A started to run? 0.25 h = 15 min

b. How long had runner B been running when he was 10 km away from his starting point? 1.5 h

c. Which runner is slower? B

d. What happens at point P? the two runners meet .

e. How far did runner A cover within 45 minutes of starting his motion?

5 Km

Q6: An object moves with an initial velocity (vi) and constant acceleration (a) in the period (t), then its final velocity (vi) is given by the expression:

$$v_f = v_i + a\Delta t$$

a. Rewrite the equation to find the time t in terms of initial velocity, final velocity, and acceleration.

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

b. Find the initial velocity v, of the object if $a = -2m/s^2$, $v = 25\ m/s$, and $t = 3s$.

$V_i^\circ = V_f - a\Delta t = 25 - (-2)(3) = 31\ m/s$

Q7: An object has an initial velocity (v_i) and constant acceleration (a). If the object's displacement is Δx, then its final velocity (v_f) is given by the expression:

$$v_f^2 = v_i^2 + 2a\Delta x$$

a. Rewrite the equation to find the displacement in terms of initial velocity, final velocity, and acceleration.

$V_f^2 - V_i^2 = 2a\Delta x \Rightarrow a = \frac{V_f^2 - V_i^2}{2\Delta x}$

b. Find the initial velocity of the object if $v_f = 25\ m/s$, $a = -2\ m/s^2$, and $\Delta x = 20m$.

$V_i^2 = V_f^2 - 2a\Delta x \Rightarrow$

$V_i = \sqrt{(25)^2 - 2(-2)(20)} = \sqrt{705} = 26.6\ m/s$

Q8: Classify the following physical quantities into vector and scalar quantity.

Acceleration: Vector

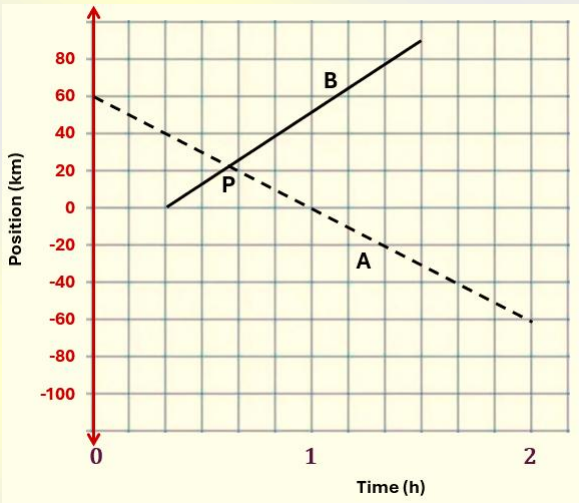
Displacement: Vector

Distance: Scalar

Time: Scalar

Q9: Two drivers- driver (A) and driver (B)- are traveling in opposite directions on a long, straight road at different constant velocities.

Their motions are represented by the position-time graph as shown below.



a. How long had driver **A** already been driving when driver **B** started to drive?

20 min

b. How long had driver **(A)** been driving when he was **60 km** away from his starting point?

1h

c. Which driver is faster?

B

d. What happens at point P?

the two drivers meet.

e. What is the position of driver (B) one hour after he has started moving?

80 Km

Q10: Complete the adjacent graphic organizer. By putting the appropriate term(s) in its proper place.

Use the following terms:

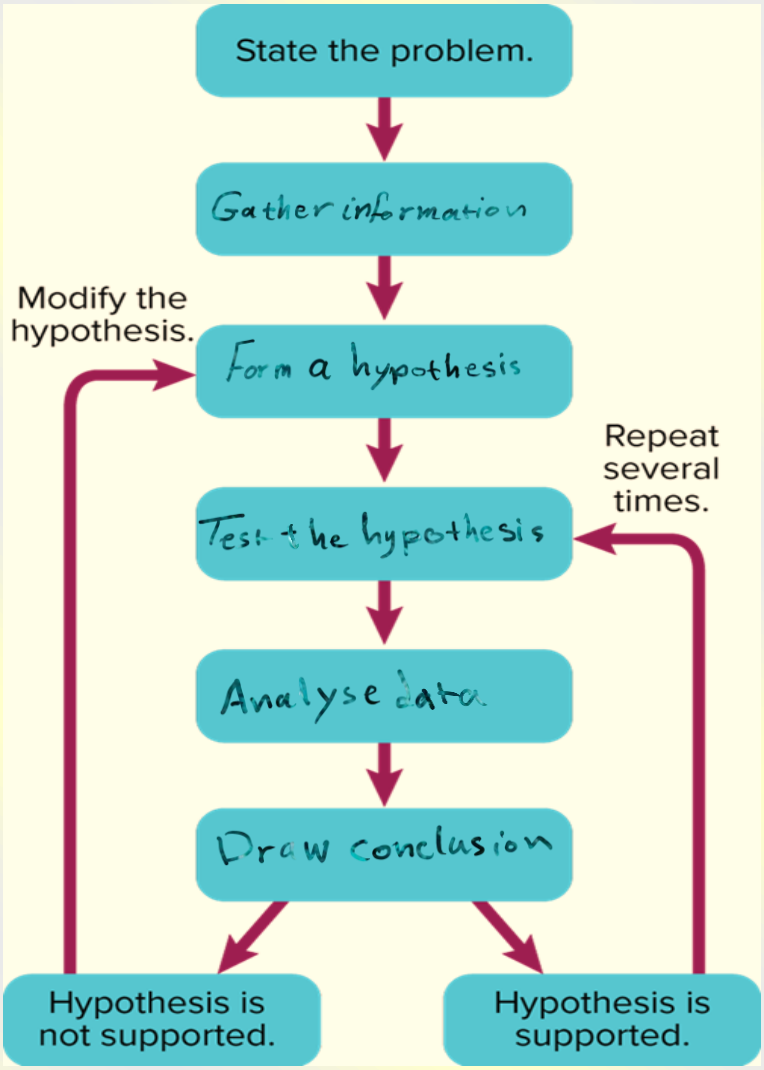
Form a hypothesis

Analyse data

Gather information

Test the hypothesis

Draw conclusions



Q11: Calculate the distance travelled by car in **12 minutes**, if its speed is **30 km/h**?

$d = s \times t = 30 \times \frac{12}{60} = 6$ Km.

Q12: The speed of an object is the distance travelled by an object per unit of time.

a. What is the unit of velocity in the International System of Units?

m/s

b. Is the unit of velocity a basic unit or a derivative?

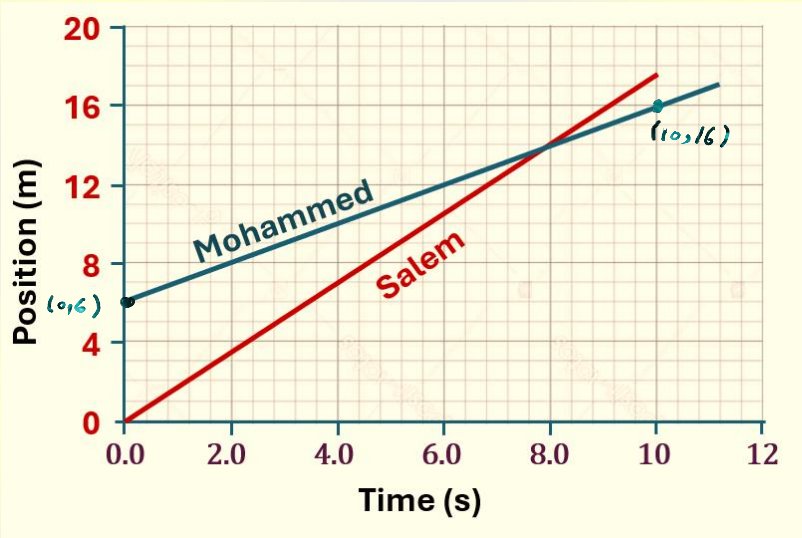
derived

Q13: Mahmoud moved a distance of **(100m)** north and then a distance of **(140m)** south, calculate the total displacement of Mahmoud?

$\Delta x = (100) + (-140) = -40$ m

$\Delta x = 40$ m south.

Q14: The figure shows the position-time graph of the two students. Mohammed and Salem. They started moving started at the same time and but two different locations.



a. What is the difference in the displacement between the two children at the start?

6 m

b. Identify both the time and location where the two children meet?

- Time: 8 s
- Location: 14 m

c. Calculate the average speed of Mohammad.

$$\text{slope} = \frac{16-6}{10-0} = \frac{10}{10} = 1\ m/s$$

Q15: Calculate how long it would take a bicycle to accelerate at **0.40m/s²** to reach a speed of **4.00m/s** starting from rest?

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

$$\Rightarrow \Delta t = \frac{V_f - V_i}{a} = \frac{4-0}{0.40} = 10\ s$$

Q16: Hamdan throws a ball vertically upwards at a speed of **20m/s**.

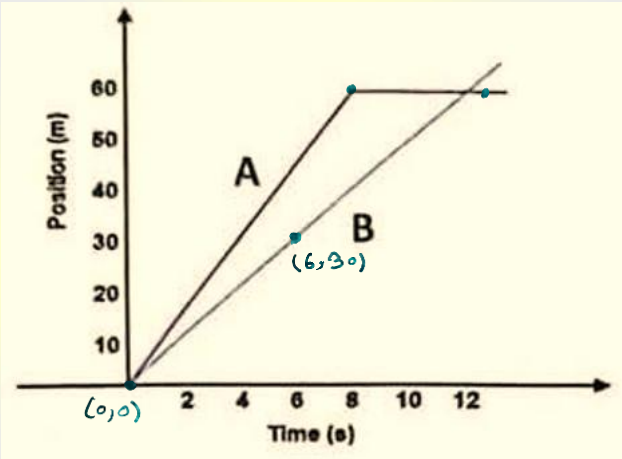
a. What is the speed of the ball when it reaches its maximum height?

$V = 0\ m/s$

b. What is its acceleration?

$a = -g = -9.8\ m/s^2$

Q17: The position-time graph in the figure shows two bikes (A and B) starting at the same time from the same position and travelling along a straight path.



a. At what time the bikes A and B **meet** in the same position during their motion?

$t = 12$ s

b. What are the displacements of each of the two bikes at **t=6.0s**?

Bike A: 45 m

Bike B: 30 m

c. How much time is needed for each bike to make a displacement of **30m** from the starting point?

Bike A: 4 s

Bike B: 6 s

d. Find the velocity of bike B.

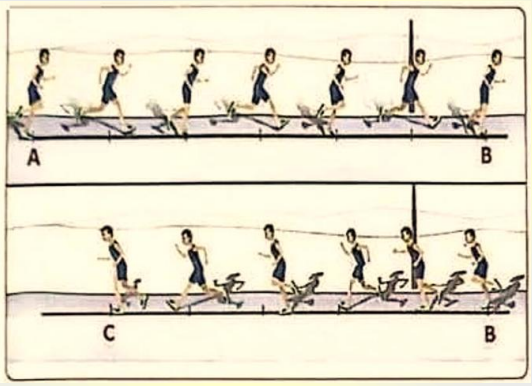
slope $= \frac{30-0}{6-0} = 5$ m/s

e. What is the velocity of bike A between **t=8s** and **t=12s**? Explain your answer.

V_A = slope = 0

the line is parallel to the x-axis and its slope is zero

Q18: Ahmed runs towards east from position A to position B, then he returns back towards west from position B to position C as shown in the figure. The distance between **A and B = 30m**, and the distance between **B and C = 25m**.



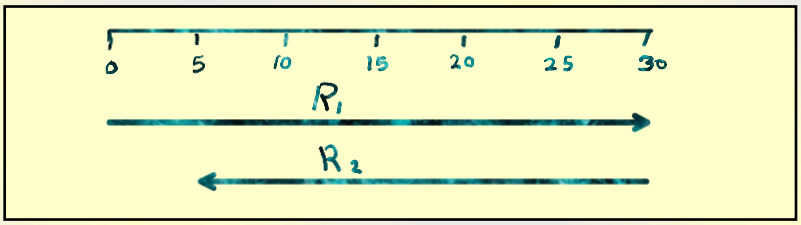
a. What is the total distance that Ahmed travelled from A to C?

$d = 30 + 25 = 55\ m$

b. Draw the following vectors in the space below

- R1: Ahmed's displacement from A to B.

- R2: Ahmed's displacement from B to C.



c. Find the magnitude of Ahmed's resultant displacement and identify its direction.

$R = R_1 + (-R_2) = 30 + (-25) = +5\ m$

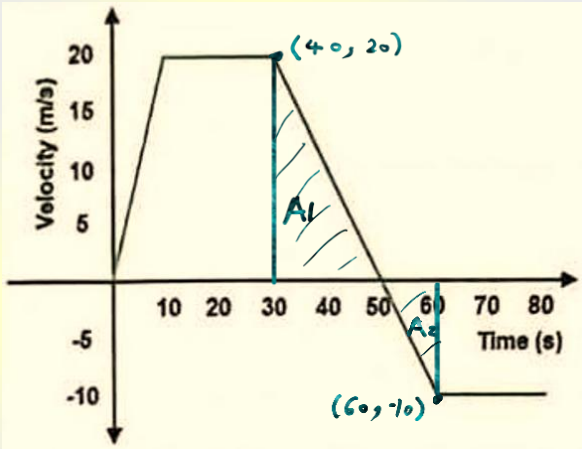
$R = 5\ m$ East

d. Ahmed takes **12s** to run from A to C. Calculate the average velocity of Ahmed when he moves from A to C.

$V = \frac{R_1}{12} = \frac{30}{12} = 2.5\ m/s$

Q19: The velocity-time graph in the Figure describes a car's motion as it moves along the road.

Using the graph, Answer the following:



a. In which time interval the car was moving with a positive acceleration?

0 – 10 sec

b. Describe the car's motion between **t = 10s** and **t = 30s**.

the car is moving with constant velocity of 20 m/s in the positive direction

c. At what time the car changed its direction?

t = 50 s

d. Calculate the acceleration of the car from **t = 40s** to **t = 60s**.

$a = \text{slope} = \frac{20 - -10}{60 - 40} = \frac{30}{20} = 1.5 \ m/s^2$

e. Find the displacement of the car from **t = 30s** to **t = 60s**.

$\Delta x = A_1 + A_2 = \frac{1}{2}(20)(20) + \frac{1}{2}(-10)(10) = 200 - 50 = 150 \ m$

Q20: An Airbus plane starts its motion on the runway from rest, with a constant acceleration and reaches a velocity of **45 m/s** in **20s**.

a. Calculate the plane's acceleration.

$\bar{a} = \frac{V_f - V_i^\circ}{\Delta t} = \frac{45-0}{20} = 2.25 \ m/s^2$

b. Find the displacement of the plane during this time interval.

$\Delta x = V_i^\circ t + \frac{1}{2} a t^2 = (0)(20) + \frac{1}{2}(2.25)(20)^2 = 450 \ m$

c. The plane should reach a velocity of **80 m/s** before its wheels leave the ground.
How much time the plane needs to reach this velocity (starting from the beginning of motion)?

$V_f = V_i^\circ + at \Rightarrow$

$t = \frac{V_f - V_i^\circ}{a} = \frac{80-0}{2.25} = 35.6 \ s$