Kinematic Equations 1

Objectives

Be able to use these formulas, the first three kinematic equations:

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

$$\Delta x = v_i \cdot \Delta t + \frac{1}{2} a(\Delta t)^2$$

$$\Delta x = \left(\frac{v_i + v_f}{2}\right) \Delta t$$

- Know that when an object is falling down, it accelerates at a rate of $9.8\ m/s^2$. Use this information the three formulas above.

Formula 1:

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

Symbol	Quantity	SI Unit
v_f	Final velocity	m/s (meters per second)
v_i	Initial Velocity	m/s (meters per second)
а	Acceleration	m/s ² (meters per second squared)
Δt	Change in time	s (seconds)

1. I have an initial velocity of 4 m/s. I have an acceleration of 5 m/s 2 .

I have a time of 4 seconds.

What is my final velocity?

vviiat is illy lillar velocity:		
Looking For	Formula	
Already Know		
A maxxxxx in a commutate contents		
Answer in a complete sentence	with unit:	

2. I have an initial velocity			
I have an acceleration of 2 I have a time of 20 seconds			
What is my final velocity?).		
Looking For	Formula		
Already Know			
Answer in a complete senter			
Allswer in a complete senter	ice with unit.		
3. I have an acceleration of	$f 3 \text{ m/s}^2$.		
I have a time of 4 seconds.	•		
I have a final velocity of 20) m/s.		
What was my initial veloc			
Looking For	Formula		
Already Know			
Answer in a complete senter	 nce with unit		
This wer in a complete senter	100 Will Will.		
4. I have an acceleration of	$f 5 \text{ m/s}^2$.		
I have a time of 3 seconds.			
I have a final velocity of 40			
What was my initial veloc			
Looking For	Formula		
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Already Know			
Answer in a complete senter	l nce with unit:		
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5. I have a final velocity of 30		
I have an initial velocity of 20) m/s.	
I have a time of 5 seconds.		
What is my acceleration? Looking For	Formula	1
LOOKING FOI	Formula	
Already Know		_1
Answer in a complete sentence	with unit:	
C. I.b. and C. all all all and A. C. C.	/-	
6. I have a final velocity of 23 I have an initial velocity of 5	•	
I have a time of 6 seconds.	111/5.	
What is my acceleration?		
Looking For	Formula	
		<u>]</u>
Already Know		
Answer in a complete sentence	with unit:	

Formula 2:

$$\Delta x = v_i \cdot \Delta t + \frac{1}{2} a(\Delta t)^2$$

Symbol	Quantity	SI Unit
Δx	Displacement	m (meters)
v_i	Initial Velocity	m/s (meters per second)
Δt	Change in time	s (seconds)
а	Acceleration	m/s ² (meters per second squared)

7. I have an initial velocity of $4\ m/s$.

I have a time of 3 s.

I have an acceleration of 6 m/s.

What is my displacement?

what is my displacement:		
Looking For	Formula	
Already Know		•
Answer in a complete sentence	with unit:	
_		

or i mave an initial velocit	y 01 0 111 ₁ 0.	
I have a time of 10 s.		
I have an acceleration of	4 m/s ² .	
What is my displacement	. ?	
Looking For	Formula	
Already Know		
Answer in a complete sent	ence with unit:	

8. I have an initial velocity of 5 m/s.

Formula 3

$$\Delta x = \left(\frac{v_i + v_f}{2}\right) \Delta t$$

Symbol	Quantity	SI Unit
Δx	Displacement	m (meters)
v_i	Initial Velocity	m/s (meters per second)
v_f	Final velocity	m/s (meters per second)
Δt	Change in time	s (seconds)

9. I have an initial velocity of 15 m/s.

I have a final velocity of 5 m/s.

I have a time of 3 seconds.

What is my displacement?

Looking For	Formula	
Already Know		I
Answer in a complete sentence	with unit:	

10. I have an initial veloc		
I have a final velocity of I have a time of 4 s.	13 m/s.	
What is my displacemen	÷7	
Looking For	Formula	
Already Know		<u> </u>
Answer in a complete sen	rence with unit:	
11. I have an initial veloc I have a final velocity of I have a displacement of What was my time?	10 m/s.	
Looking For	Formula	
Already Know		
Answer in a complete sen	rence with unit:	
12. I have an initial veloc I have a final velocity of I have a displacement of What was my time?	18 m/s.	
Looking For	Formula	
Already Know		l
Answer in a complete sen	rence with unit:	

Answers:

- **1.** 24 m/s
- **2.** 58 m/s
- 3. 8 m/s 4. 25 m/s
- 5. 2 m/s² 6. 3 m/s²
- **7.** 39 m
- **8.** 250 m
- **9.** 30 m
- **10.** 32 m
- **11.** 8 s
- **12.** 6 s