

Answers

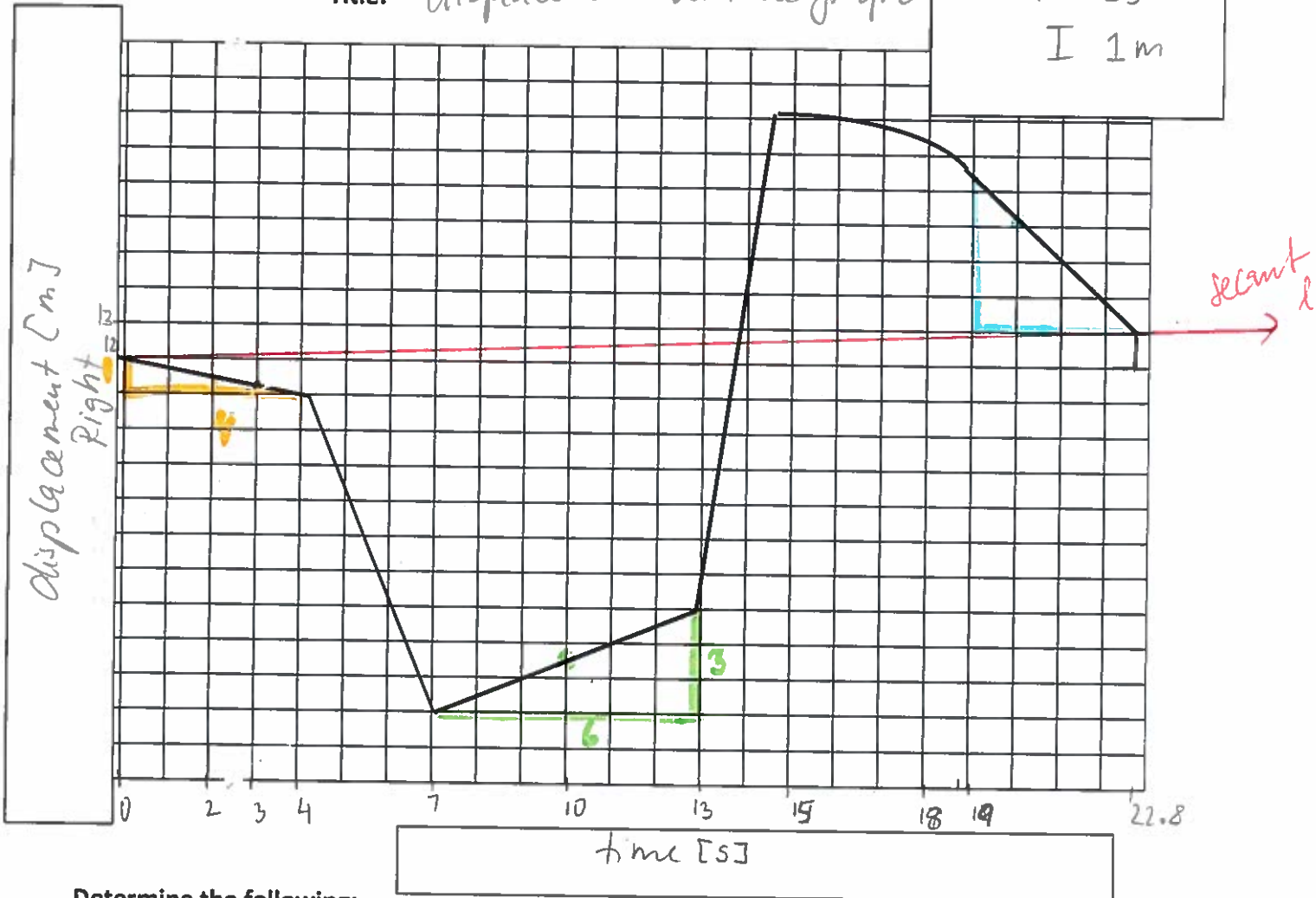
PHYSICS 11

DETERMINING INSTANTANEOUS AND AVERAGE VELOCITY USING A GRAPH 2

A:

Title: displacement vs. time graph

Scale: H 1s
I 1m



Determine the following:

Length of the time interval	$\Delta t = 22.8 \text{ s}$
Time interval when the object is at rest	N/A, maybe $t = 4.2$ (7) 13, (14.5) s
Average velocity for the first 3 seconds	$\vec{v}_{\text{avg}} = -\frac{1}{4} \text{ m/s [R]} = 0.25 \text{ m/s [L]}$
Average velocity for the entire time interval	$\vec{v}_{\text{avg}} = \frac{1}{22.8} \text{ m/s [R]} = 4.39 \times 10^{-2} \text{ m/s [R]}$
Instantaneous velocity for $t=10 \text{ s}$	$\vec{v}_{\text{inst}} = \frac{3}{6} = 0.50 \text{ m/s [R]}$
Instantaneous velocity for $t=2 \text{ s}$	$\vec{v}_{\text{inst}} = -\frac{1}{4} = -0.25 \text{ m/s [R]} = 0.25 \text{ m/s [L]}$
Instantaneous velocity for $t=20 \text{ s}$	$\vec{v}_{\text{inst}} = \frac{4.3}{9.8} \text{ m/s [R]} = 1.1 \text{ m/s [L]}$
Is the motion uniform or non-uniform?	non-uniform
Change in displacement	$\Delta \vec{d} = \vec{d}_f - \vec{d}_i$

$$= 13 - 12$$

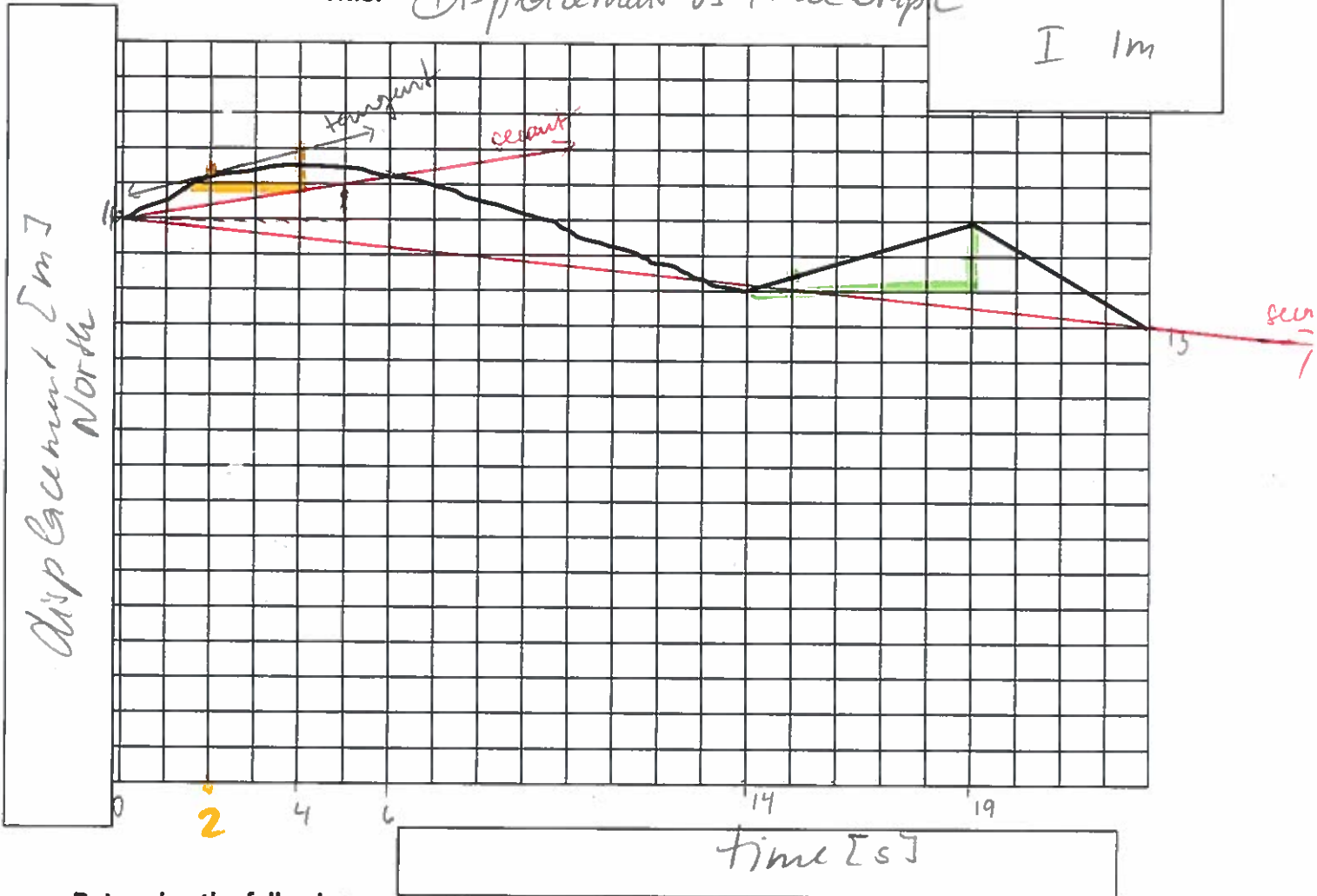
$$= 1 \text{ m [R]}$$

B:

Title: Displacement vs Time Graph

Scale: H 1 s

I 1 m



Determine the following:

Length of the time interval	$\Delta t = 23 \text{ s}$
Time interval when the object is at rest	yes at $t = 4 \text{ s}$ and maybe $t = 14 \text{ s}$, $t = 19 \text{ s}$
Average velocity for the first 6 seconds	$\vec{v}_{\text{avg}} = \frac{1}{6} \text{ m/s [N]} = 0.20 \text{ m/s [N]}$
Average velocity for the entire time interval	$\vec{v}_{\text{avg}} = \frac{-3}{23} \text{ m/s [N]} = -0.13 \text{ m/s [N]} = 0.13 \text{ m/s [S]}$
Instantaneous velocity for $t = 15 \text{ s}$	$\vec{v}_{\text{inst}} = 2/5 = 0.40 \text{ m/s [N]}$
Instantaneous velocity for $t = 2 \text{ s}$	$\vec{v}_{\text{inst}} = 1/3 \text{ m/s [N]} = 0.33 \text{ m/s [N]}$
Instantaneous velocity for $t = 19 \text{ s}$	N/A maybe zero
Is the motion uniform or non-uniform?	non-uniform
Change in displacement	$\Delta \vec{d} = \vec{d}_f - \vec{d}_i$

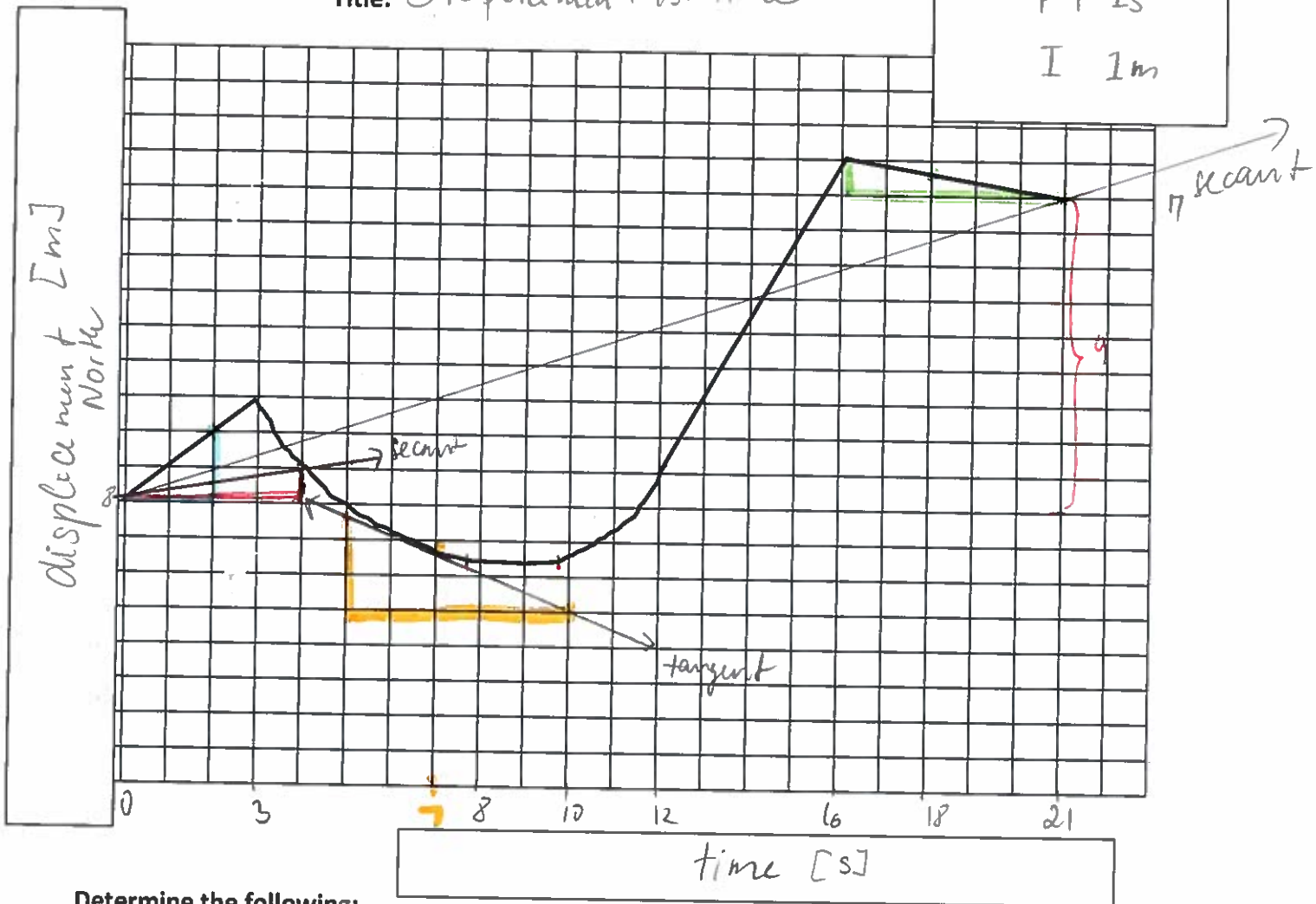
$$= 13 - 16$$

$$= -3 \text{ m [N]} = 3 \text{ m [S]}$$

C:

Title: Displacement vs. Time

Scale: $\text{H} \ 1\text{s}$
 $\text{I} \ 1\text{m}$



Determine the following:

Length of the time interval	$\Delta t = 21\text{s}$
Time interval when the object is at rest	yes. $t \in [7.8, 9.8]\text{s}$
Average velocity for the first 4 seconds	$\vec{v}_{\text{avg}} = \frac{1}{4} \text{ m/s [N]} = 0.25 \text{ m/s [N]}$
Average velocity for the entire time interval	$\vec{v}_{\text{avg}} = \frac{9}{21} \text{ m/s [N]} = 0.43 \text{ m/s [N]}$
Instantaneous velocity for $t=7\text{s}$	$\vec{v}_{\text{inst}} = -\frac{2.7}{5} = -0.54 \text{ m/s [N]} = 0.54 \text{ m/s [S]}$
Instantaneous velocity for $t=2\text{s}$	$\vec{v}_{\text{inst}} = \frac{2}{2} \text{ m/s [N]} = 1.0 \text{ m/s [N]}$
Instantaneous velocity for $t=18\text{s}$	$\vec{v}_{\text{inst}} = -\frac{1}{5} = -0.20 \text{ m/s [N]} = 0.20 \text{ m/s [S]}$
Is the motion uniform or non-uniform?	non-uniform
Change in displacement	$\Delta \vec{d} = \vec{d}_f - \vec{d}_i$

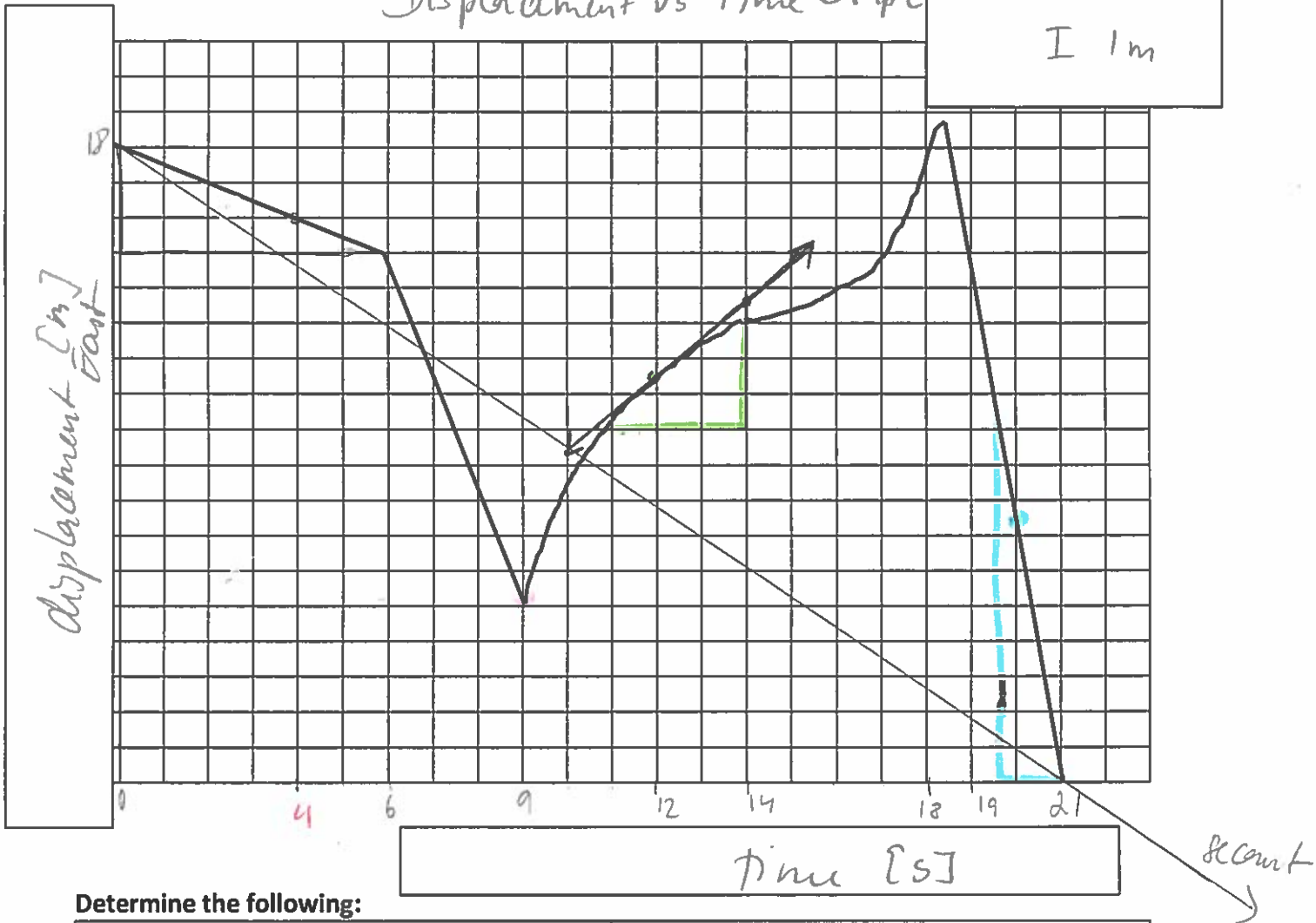
$$= 17 - 8$$

$$= \underline{9 \text{ m [N]}}$$

D:

Title: Displacement vs Time Graph

Scale: \square 1s
 \square 1m



Determine the following:

Length of the time interval	$\Delta t = 21s$
Time interval when the object is at rest	N/A ; maybe at $t=6, 9, 14, 18.4s$
Average velocity for the first 4 seconds	$\vec{v}_{avg} = -3/6 m/s = -1/2 m/s [E] = 0.5 m/s [W]$
Average velocity for the entire time interval	$\vec{v}_{avg} = -18/21 m/s [E] = -0.86 m/s [E] = 0.86 m/s [W]$
Instantaneous velocity for $t=12s$	$\vec{v}_{inst} = \frac{3.7}{3.5} m/s [E] = 1.06 m/s [E]$
Instantaneous velocity for $t=9s$	N/A ; maybe $\vec{v}_{inst} = 0 m/s [E]$
Instantaneous velocity for $t=20s$	$\vec{v}_{inst} = -1/1.5 m/s [E] = -0.73 m/s [E] = 0.73 m/s [W]$
Is the motion uniform or non-uniform?	non-uniform
Change in displacement	$\Delta \vec{d} = d_f - d_i$

$$= 0 - 18$$

$$= -18m [E] = 18m [W]$$