

Chapter 8 Practice

Name:

KEY

Date:

1. Usain Bolt set the world indoor track record in 2009 by running **north** 100 m in 9.58 s. What was his average velocity? **Show all your work**

$$\vec{V}_{av} = \frac{\Delta \vec{d}}{\Delta t} = \frac{100 \text{ m [N]}}{9.58 \text{ s}} = 10.438 \text{ m/s}$$

$$= 10.4 \text{ m/s [N]}$$

2. A boat travels across a 45 km lake with an average forward velocity of 15 km/h.

a) How many hours does it take for this boat to cross the lake? **Show all your work**

$$\Delta t = \frac{\Delta \vec{d}}{\vec{V}_{av}} = \frac{45 \text{ km}}{15 \text{ km/h}} = 3 \text{ hours}$$

b) How fast is the boat going in m/s? **Show all your work**

$$15 \frac{\text{km}}{\text{h}} \div 3.6 \rightarrow ? \text{ m/s}$$

$$15 \frac{\text{km}}{\text{h}} \times \frac{1000 \text{ m}}{1 \text{ km}} \times \frac{1 \text{ h}}{3600 \text{ s}} \rightarrow \frac{15 \times 1000 \text{ m}}{3600 \text{ s}} = \frac{1500 \text{ m}}{360 \text{ s}} = 4.2 \text{ m/s}$$

3. The position-time graph below shows the motion of a helicopter. What is the average velocity of the helicopter for each of the following time intervals?

a) 0 s – 20 s

$$\frac{400 \text{ m [N]}}{20 \text{ s}} = 20 \frac{\text{m}}{\text{s}} \text{ [N]}$$

b) 20 s – 30 s

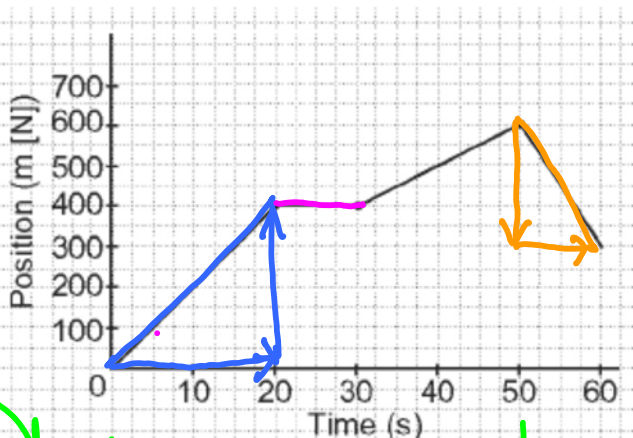
$$\frac{0 \text{ m}}{10 \text{ s}} = 0 \text{ m/s}$$

c) 50 s – 60 s

$$\frac{-300 \text{ m}}{10 \text{ s}} = -30 \text{ m/s}$$

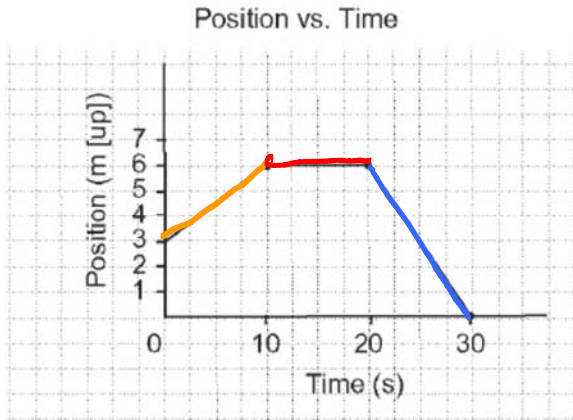
+/- refers to direction.

$$= 30 \text{ m/s [S]}$$



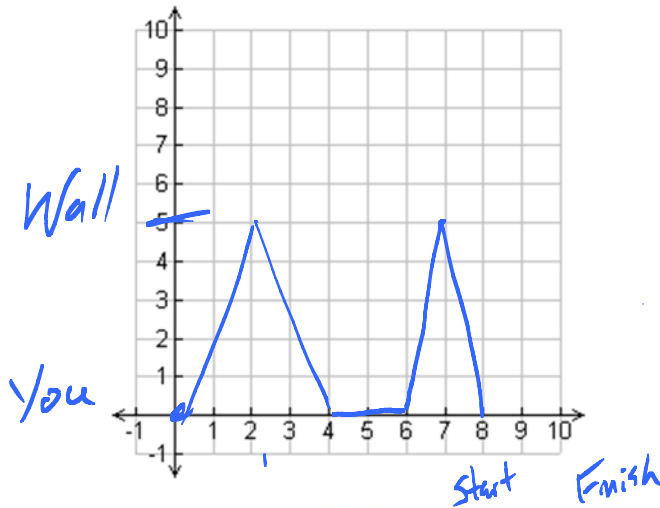
+ = [N]
- = [S]

4. The motion of an elevator is represented by the position-time graph below. Describe, using words, the motion of the elevator during the 30 s time interval. (3 marks)

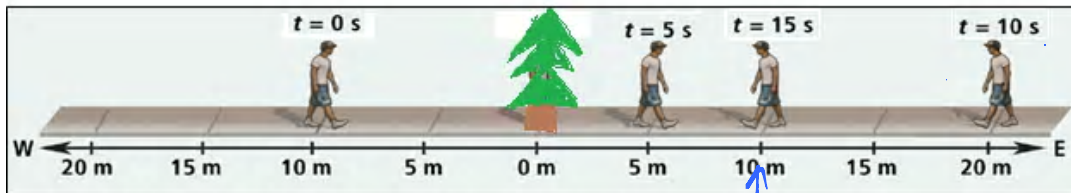


Up 3m in 10s (uniform motion)
 Stayed at 6m point for 10s
 Went down 6m to 0m in 10s
 (uniform motion)

5. Draw a Position-Time graph for the following situation, and label each axis. A student rolls a ball toward a wall with uniform motion. The ball hits the wall and rolls back to the student with uniform motion. The student catches the ball and after a few second rolls it to the wall again, except with a faster velocity. The ball once again hits the wall and comes back to the student who catches it. Use the origin as your reference point.



6.



A man starts walking from a position 10m [W] of a tree. He continues until he is at a position 20m [E] of the tree and turns around and walks until he is at a position 10m [E] of the tree. Complete the following table.

Time Interval	\bar{d}_f <small>final position</small>	\bar{d}_i <small>start position</small>	Δ position Displacement $\Delta \bar{d}$	Distance
0s - 5s	5m [E] +5m	10m [W] -10m	+5 - (-10) +15m 15m [E]	15m
0s - 10s	20m [E] +20m	10m [W] -10m	+20 - (-10) +30m 30m [E]	30m
0s - 15s	10m [E] +10m	10m [W] -10m	+10 - (-10) +20m 20m [E]	30+10 40m
5s - 15s	10m [E] +10m	5m [E] +5m	+10 - 5 +5m 5m [E]	5+10 25m

