Feb. 10

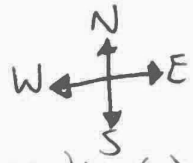
Scalar vs. Vector Quantities

Scalar: amount of something

- Quantities that only have a size (NO direction **mentioned**)
  - Time (*t*), mass (*m*), distance (*d*)

Examples:
- I walked 6m.
- The trip took 5 hrs.

Direction



- North (N) > positive (+)
- East (E) > positive (+)
- South (S) > negative (-)
- West (W) > negative (-)

- left/right
- forward/backward

Vector:

- Quantities that have both size and direction.

The direction is usually found in square brackets after the units. (Compass points are usually used, as are positive and negative).
- Vectors are represented either with boldfaced type or with an arrow (→) above the symbol.

Examples:
- $\vec{d}$ = 20 m [N],
- $\vec{v}$ = + 12 km/h [E]

Time and Time Intervals

- Time is always represented by a "t" *common units are: seconds (s), minutes (min), hours (h)
- Time can be looked at in two different ways:
  1. **Instant**: this is the exact time for a moment.
  2. **Interval**: this is the time it takes for something to happen. It can also be described as the change in time. This can also be described as the final time minus the initial time. To calculate a time interval we use the equation:

time interval ← $\Delta t = t_f - t_i$

t_f: final time; t_i: initial time

**Note: Delta represented by "Δ" stands for "change in". It means to take the final (or second) measurement minus the initial (or first) measurement.

Example1: *OR $\Delta t = t_2 - t_1$

Classify each as an instant or interval

a. You leave for school at 8:07 am. instant.

b. A flight takes 1 hour and 51 minutes. interval

c. You started work at 7 pm. instant

d. It will take 15 minutes to drive to the mall. interval.

Example 2:

Calculate the following time intervals:

a. The ball hit the ground at 1s, and stopped bouncing at 10 s. 9s

$\Delta t = ?$ $\quad \Delta t = t_f - t_i$

$t_i = 1s \quad = 10s - 1s$

$t_f = 10s \quad = 9s$

b. The runner finished a race in 1 hour and 14 minutes. Calculate the time interval in minutes.

1 h + 14 min

60 min + 14 min = 74 min.

DATE NAME CLASS

CHAPTER 9 REINFORCEMENT **BLM 9-10**

Calculating Time Intervals and Displacements

Goal • Practise calculating change in time and displacement.

What to Do

Answer each question in the space provided.

1. Complete each table below.

(a)

t_i	t_f	Δt
1.0 s	5.0 s	4.0 s
4.56 s	19.71 s	15.15 s
0 h	3.5 h	3.5 h
5 s	14.0 s	9.0 s
3 min	5 min	5 min

(b)

$\vec{d}_i$	$\vec{d}_f$	$\Delta\vec{d}$
+3.4 m	+7.8 m	
+14.7 m	+3.1 m	
+12.0 km	+15.7 km	
+13.1 m		+102.3 m
	+14.8 cm	+9.1 cm

2. Solve the following problems.

(a) A runner is moving along a straight road. At a time of 0.62 s, the runner's position is +10.6 m. Later, at a time of 9.93 s, the runner's position is +73.9 m. Find the time interval and displacement for the runner.

$\Delta t = ?$ $\Delta t = t_f - t_i$

$t_i = 0.62$ s $= 9.93$ s $- 0.62$ s

$t_f = 9.93$ s $= 9.31$ s

$\Delta t = 9.31$ s

(b) A person is driving a car along a straight highway. The car's position at 9:00 a.m. is 13 km from home. Its position at 10:30 a.m. is 137 km from home. Find the time interval and displacement for this section of the journey.

$\Delta t = ?$ second difference between time!

$t_i = 9.00$ a.m.

$t_f = 10:30$ a.m. $\Delta t = 1.5$ hours

