SUVA SANGAM COLLEGE

YEAR 11

PHYSICS

WORKSHEET 7

STRAND 1 MECHANICS
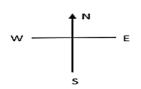
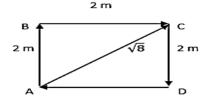| NO.	CONCEPT IN BRIEF: KINEMATICS
	Distance and Displacement • The symbol used for both distance and displacement is (d). • Distance and displacement both involve a change in position. • Distance is a scalar quantity while displacement is a vector. Example: A model train travels around the track from A to B then to C and to D and back to A as shown below. Starting Point is A The table shows the distance moved by the train and the displacement at various stages of the journey around the track. <table><tr><th></th><th>Distance travelled</th><th>Displacement From Start</th></tr><tr><td>At B</td><td>2 m</td><td>2 m north</td></tr><tr><td>At C</td><td>4 m</td><td>√8 m northeast</td></tr><tr><td>At D</td><td>6 m</td><td>2 m east</td></tr><tr><td>Back at the Start, A</td><td>8 m</td><td>0 m</td></tr></table>
1	During a competition, a competitor begins by travelling 5.0 km west. She then travels 2.0 km north and finally travels 5.0 km east. (a) What distances did she travelled? (b) What is her displacement from the start?
	CONCEPT IN BRIEF: KINEMATICS **Speed and Velocity** • Speed is defined as distance travelled per unit time. $$speed = \frac{distance\ (m)}{time\ (s)}$$ • The SI unit of speed is m/s and is a scalar quantity for example 2 m/s. • Velocity can be defined as speed in a given direction. $$VELOCITY = \frac{displacement\ (m)}{time\ (s)}$$ • The SI unit of velocity is the same as that of speed i.e. m/s and it is a vector quantity.

2.	A car is driven 3.0 km east for 5 minutes, then 4.0 km south for 8 minutes and finally 3.0 km west for 2.0 minutes.
	
	        (a) Calculate the cars average speed in km/h for the whole trip.
	        (b) Find the cars average velocity in km/h for the whole trip.

	CONCEPT IN BRIEF: KINEMATICS
	 Acceleration
	
	  • Acceleration is when an object changes velocity (i.e. speed increases, slows down or changes direction).
	  • It is calculated by dividing the change in velocity by the time taken for the change in velocity to occur.
	  • The unit of acceleration is meter per second per second (m/s^2).
	
	$$\text{Acceleration} = \frac{\text{Change in velocity}}{\text{Change in time}}$$
	
	$$a = \frac{\Delta v}{\Delta t}$$
	
	  • Acceleration is used both as scalar and a vector quantity. When used in scalar, acceleration is calculated from.
	
	$$\text{Acceleration} = \frac{\text{Change in speed}}{\text{Change in time}}$$

3	A car travelling at 5 m/s change its speed to 30 m/s in the time of 10 seconds. Calculate its acceleration.