**KINEMATICS WORKSHEET 2**

**Relative Velocity in a Straight Line**

1. A boy is running at 3 ms-1 along a straight path towards a girl, who in turn is running at 4 ms-1 towards the boy. Calculate the velocity of the girl relative to the boy.
2. A boy is running at 3 ms-1 along a straight path. A girl is running along the same path in the same direction as the boy at 4 ms-1. Calculate the velocity of the girl relative to the boy.
3. A boy is running at 3 ms-1 along a straight path. A girl is running along the same path in the same direction as the boy at 4 ms-1. Calculate the velocity of the boy relative to the girl.
4. Two racing cars are travelling in the same direction along straight parallel paths. Car A has a speed of 200 km/h and Car B has a speed of 215 km/h. Determine the velocity of Car A relative to Car B.
5. Two swimmers in adjacent parallel lanes are swimming in the same direction. Sabrina is swimming at 1.1 ms-1 and Bronte is swimming at 0.9 ms-1. Find the relative velocity of Bronte compared to Sabrina.

**ANSWERS:**

1. Example solution : velocity of boy, v̰b = 3 ms-1 and velocity of girl, v̰g = -4 ms-1  
   So, velocity of the girl relative to the boy, v̰gb = v̰g - v̰b = -4 – 3 = -7 ms-1 or 7 ms-1 towards the boy.
2. Example solution : velocity of boy, v̰b = 3 ms-1 and velocity of girl, v̰g = 4 ms-1  
   So, velocity of the girl relative to the boy, v̰gb = v̰g - v̰b = 4 – 3 = +1 ms-1 or 1 ms-1 in the direction of the boy’s motion.
3. Example solution : velocity of boy, v̰b = 3 ms-1 and velocity of girl, v̰g = 4 ms-1  
   So, velocity of the boy relative to the girl, v̰bg = v̰b - v̰g = 3 – 4 = –1 ms-1 or 1 ms-1 in the direction opposite to the girl’s motion.
4. Velocity of Car A relative to Car B is 15 km/h in a direction opposite to the cars’ forward motion.
5. Velocity of Bronte relative to Sabrina is 0.2 ms-1 in a direction opposite to the girls’ forward motion.