

Homework 2

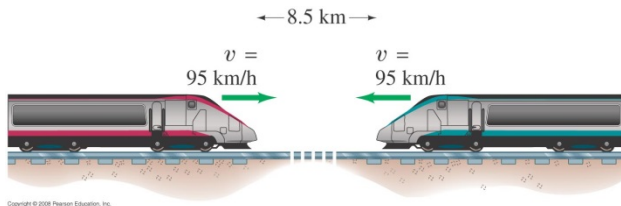
PHYS 211

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3. A particle at $t_1 = -2.0 \text{ s}$ is at $x_1 = 4.3 \text{ cm}$ and at $t_2 = 4.5 \text{ s}$ is at $x_2 = 8.5 \text{ cm}$ what is its average velocity? Can you calculate its average speed from these data?

8. The position of a small object is given by $x = 34 + 10t - 2t^3$, where t is in seconds and x in meters. (a) Plot x as a function of t from $t = 0$ to $t = 3.0 \text{ s}$. (b) Find the average velocity of the object between 0 and 3.0 s. (c) At what time between 0 and 3.0 s is the instantaneous velocity zero?

12. Two locomotives approach each other on parallel tracks. Each has a speed of 95 km/h with respect to the ground. If they are initially 8.5 km apart, how long will it be before they reach each other? (See Fig. 2–38).



22. A sprinter accelerates from rest to 9.00 m/s in 1.28 s . What is her acceleration in (a) m/s^2 ; (b) km/h^2 ?

27. A particle moves along the x axis. Its position as a function of time is given by $x = 6.8t + 8.5t^2$, where t is in seconds and x is in meters. What is the acceleration as a function of time?

29. The position of an object is given by $x = At + Bt^2$, where x is in meters and t is in seconds. (a) What are the units of A and B ? (b) What is the acceleration as a function of

time? (c) What are the velocity and acceleration at $t = 5.0$ s? (d) What is the velocity as a function of time if $x = At + Bt^{2.3}$?

46. A runner hopes to complete the 10,000-m run in less than 30.0 min. After running at constant speed for exactly 27.0 min, there are still 1100 m to go. The runner must then accelerate at 0.20 m/s^2 for how many seconds in order to achieve the desired time?