

Euclidiad Olympiad Training LEVEL 1

Day 11 - Notes

$$\text{Distance} = \text{Speed} \times \text{Time}$$

$$\text{Time} = \frac{\text{Speed}}{\text{Distance}}.$$

For the same period of time,

$$\text{Distance ratio} = \text{Speed ratio}.$$

For the same speed,

$$\text{Distance ratio} = \frac{1}{\text{Time ratio}}.$$

Examples given in class

Example 1. Jack and Jill are going swimming at a pool that is one mile from their house. They leave home simultaneously. Jill rides her bicycle to the pool at a constant speed of 10 miles per hour. Jack walks to the pool at a constant speed of 4 miles per hour. How many minutes before Jack does Jill arrive?

Example 2. George walks 1 mile to school. He leaves home at the same time each day, walks at a steady speed of 3 miles per hour, and arrives just as school begins. Today he was distracted by the pleasant weather and walked the first $\frac{1}{2}$ mile at a speed of only 2 miles per hour. At how many miles per hour must George run the last $\frac{1}{2}$ mile in order to arrive just as school begins today?

Example 3. A car travels from Town A to Town B at a speed of 90 km/h. It then returns at a speed of 60 km/h. What is the average speed of the car for the whole trip?

Ko Shan Solution: Average speed $= \frac{90+60}{2} = 75$ km/h.

Example 4. Professor Snark was walking towards the library at a constant speed of 80 m/min. His favourite dog ran towards the library at a speed of 140 m/min. It returned to the professor at the same speed upon reaching the library again, and so on. Professor Snark arrived at the library 6 minutes later. What was the total distance covered by the dog?

Example 5. Ko Ko walks to school at a speed of 2 m/s. After 90 seconds, his mother realizes that he has left his pencil case at home and immediately goes after

him. After she passes the pencil case to Ko Ko, she walks home at the same speed and reaches home the same time Ko Ko arrives at school. Given that the mother's speed is 3 m/s, how far away is the school from home?

Example 6. The speeds of a car and a truck were 75 km/h and 50 km/h respectively. They left Town A at the same time for Town B . The car passed an oncoming van 6 hours later. 1.5 hours after that, the truck and the same van passed each other. Find the speed of the van.

Example 7. Bella begins to walk from her house toward her friend Ella's house. At the same time, Ella begins to ride her bicycle toward Bella's house. They each maintain a constant speed, and Ella rides 5 times as fast as Bella walks. The distance between their houses is 2 miles, which is 10,560 feet, and Bella covers 2.5 feet with each step. How many steps will Bella take by the time she meets Ella?

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Day 11 - Homework

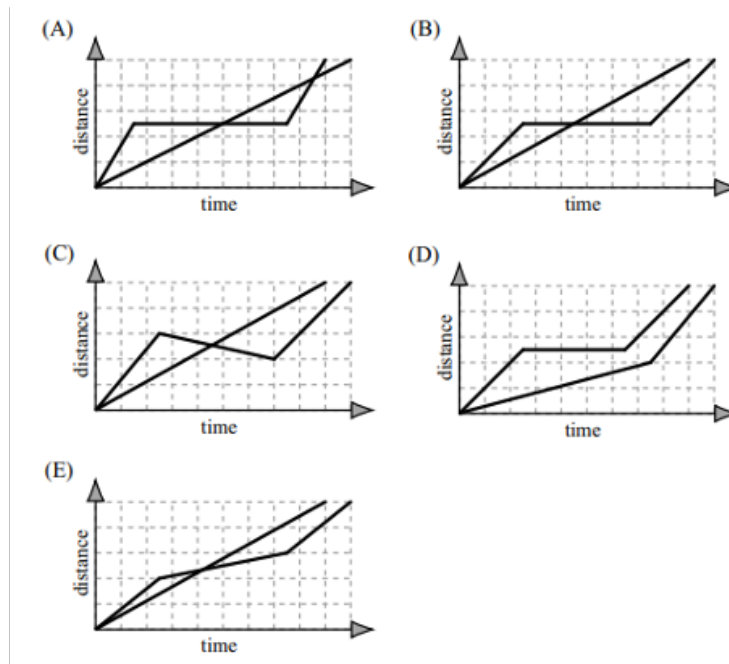
Homework code : **HWA104**

Issued on : 7th June 2021

Due date : 21st June 2021

*Submit the solutions to at least 6 of the homework problems before the due date.
Problems 1-10 are each worth 5 points. Challenge problems are worth 10 points each.*

1. When Cheenu was a boy, he could run 15 miles in 3 hours and 30 minutes. Now, as an old man he can only walk 10 miles in 4 hours. How many minutes longer does it take for him to walk a mile now compared to when he was a boy?
2. A tortoise challenges a hare to a race. The hare eagerly agrees and quickly runs ahead, leaving the slow-moving tortoise behind. Confident that he will win, the hare stops to take a nap. Meanwhile, the tortoise walks at a slow steady pace for the entire race. The hare then wakes up and runs to the finish line, only to find the tortoise already there. Which of the following graphs matches the description of the race, showing the distance d traveled by the two animals over time t from start to finish?



3. Aung Aung rides his motorcycle 35 mph in sunny weather and 20 mph in the rain. Yesterday morning, it was sunny for some time and raining for some time. He rode a total of 21 miles for 45 minutes. Find the distance and duration he rode in the rain.

4. Mr. Smith drives at a constant speed of 108 km/h to his office every morning. He drives at a constant speed of 72 km/h for his return trip. What is his average speed for the round trip?
5. On a trip to the beach, Anh traveled 50 miles on the highway and 10 miles on a coastal access road. He drove three times as fast on the highway as on the coastal road. If Anh spent 30 minutes driving on the coastal road, how many minutes did his entire trip take?
6. U Mya drove from town *A* to Town *B* at a constant speed of 50 km/h. He then drove back to Town *A* at a constant speed of 80 km/h. The total time taken for the whole journey was 6.5 h. Find the distance between the two towns.
7. Car *A* and Car *B* left Town *A* for Town *B* at 60 km/h and 70 km/h respectively. At the same time, Car *C* left Town *B* for Town *A* at 80 km/h. Car *C* passed Car *A* 1.5 hours after it passed Car *B*. Find the distance between Town *A* and Town *B*.
8. A triathlete walks for 1 km, runs for the next 2 km and cycles for the last 3 km. He can cycle twice as fast as he runs and twice as fast as he walks. The total time for the three activities is 12.5 minutes more than that if he has cycled for the whole journey. How much time does he take for each activity?
9. A car travelled towards Town *B* from Town *A*. A van headed to Town *A* from Town *B* at the same time. They met each other 80km from the midway of the two towns. The speed of the car was 1.4 times that of the van. Find the distance between the two towns.
10. The ratio of walking speed of Ko Nyi and Ko Lat is 2 : 3. The ratio of walking speed of Ko Lat and Ko Gyi is 4 : 5. If Ko Gyi can cover 35 more meters than Ko Nyi in one minute, how many more meters can Ko Lat cover in 10 minutes than Ko Nyi?

Challenge Problems

11. Each day for the four days, Linda travelled for one hour at a speed that resulted in her traveling one mile in an integer number of minutes. Each day after the first, her speed decreased so that the number of minutes to travel one mile increased by 5 minutes over the preceding day. Each of the four days, her distance travelled was also an integer number of miles. What was the total number of miles for the four trips?
12. A cyclist was heading towards Town *A* and planned to arrive there by noon. For the first half of his journey, the ratio of actual speed to planned speed was 13 : 17. What would be the ratio of actual speed to planned speed for the second half of the journey if he wanted to arrive as planned?

13. Moe Moe walks from town A to town B and Hnin Hnin bikes from town B to town A . They started at the same time and travelled with constant speeds. They met each other at some distance in the journey and the time required for Moe Moe to reach the end of journey is 9 times the time required for Hnin Hnin to reach the end of the journey. Moe Moe is walking at the speed of 80 m/min. Find Hnin Hnin's biking speed.