

Calculating Motion Fun **ANSWERS** (Speed/Distance/Time & Acceleration)

Use your **Physic Equation Notes** to calculate the **speed, distance, time, acceleration, and/or momentum** in the following situations. Please **write down the equation** you are using for each question and **show your work (including units)**. (Round to the nearest tenth (one decimal place))

1. What is the **speed** of a plane that can go from Los Angeles to Hawaii, a distance of approximately 4850 km, in 4 hours? **1212.5 km/h**
2. Multiply your answer in #1 by .62 and it will give you the speed in mph.
*FYI The **speed of sound (Mach 1)** is 750 mph (335 m/s) at sea level. **751.8 mph**
3. Lake Tahoe, the deepest lake in North America, takes about 9 hours to get to if your average speed is 95 km/hr. Approximately **how far** is Lake Tahoe from Irvine? **855 km**
4. **How long** would it take you to run a 21 km race (a half marathon) if your average speed is 14 km/h?
1.5 hrs
5. The Ferrari F40 can go from 0 km/h to 100 km/h in 4.1 seconds. Approximately how fast is this car **accelerating**? **24.4 km/h/s or 6.8 m/s²**
6. Catalina Island is approximately 48 km away. **How long** would it take if you could swim at a rate of 3 km/h? **16 hrs**
7. Joshua created a mutant *Torticorn* (unicorn and tortoise) that swims at 6km/h and likes to eat swimming humans. **How many hours** head start do you need so the *Torticorn* does not catch and eat you while you swim to Catalina Island? **at least 8 hrs**
8. It took the space shuttle an average of 90 minutes to complete one orbit around the world. If the distance traveled is 43000 km, **how fast** is the shuttle going?
28666.7 km/h or 8 km/s or 8000 m/s or 477.8 km/min
9. **How long** will it take you to walk to the Beach if Laguna Beach is 16 km away and you can walk 3.55 km/h? **4.5 hrs**
10. If the SR-71 Blackbird spy plane is traveling at 3500 km/h (Mach 3+) for 12 hours, **how far** will it have flown? **42000 km**
11. Luke Skywalker is ordered to jump off a plank and into the Great Pit of Carkoon (which contains a hungry Sarlacc). Luke uses his Jedi powers to jump backwards 4 meters and land on the deck of a transporter. He then runs 3 meters to the left, turns 180 degrees and runs back 3 meters to the right. What was the total **distance** he moved? (ignore his vertical distance) **10m**
12. What was Luke's total **displacement** during this event? **4 m backwards or -4 m (the negative sign means that Luke moved backwards from his starting position)**

13. What is the **average speed** of a homing pigeon that leaves your home at 10:00 AM and arrives at Disneyland at 11:00 AM? The distance from your house to Disneyland is 20 kilometers. What was the average speed of your pigeon? **20 km/h**
14. The pigeon hangs out with Mickey for a few minutes. At 11:30 AM the pigeon leaves to come back home. Your pigeon makes it back home by 12:00 PM. What was the **average speed** of your pigeon coming home? **40 km/h**
15. What was the **average speed** for the entire trip the pigeon took including hanging out with Mickey Mouse? (*Make sure your answer makes sense and you look at the information from #13 and 14*)
20 km/h
16. A train sees a car stuck on the tracks ahead. The engineer applies the brakes. The train goes from 90 km/h to 0 km/h in 60 sec. **What is the train's acceleration?** (**What does the negative sign mean?**)
1.5km/h/s or .4m/s² (the negative sign shows that the train is slowing down (decelerating))
17. You have two cars that are trying to meet in Monterey to visit the beautiful sea otters along the Central Coast of California. One car is heading south with a velocity of 110 km/h and another car is heading north with a velocity of 90 km/h. They need to cover 1200 km total between the two of them. **How long** will it take them to arrive in Monterey to visit the awesome little sea otters?
6 hours

BONUS CHALLENGE QUESTION OF MOTION FUN:

How far apart must each car be from Monterrey so that both cars arrive at the same time to see the sea otters in Monterrey? The average speed for the car heading south (starts in Northern California) is 110 km/h and 90 km/h for the car heading north (starts in Southern California). **How far would the car from Northern California** and **how far would the car from Southern California** need to drive to make this road trip be an on-time success?
660km for the car coming from the north
540 km for the car coming from the south